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AUTHOR Werling, Donn Paul
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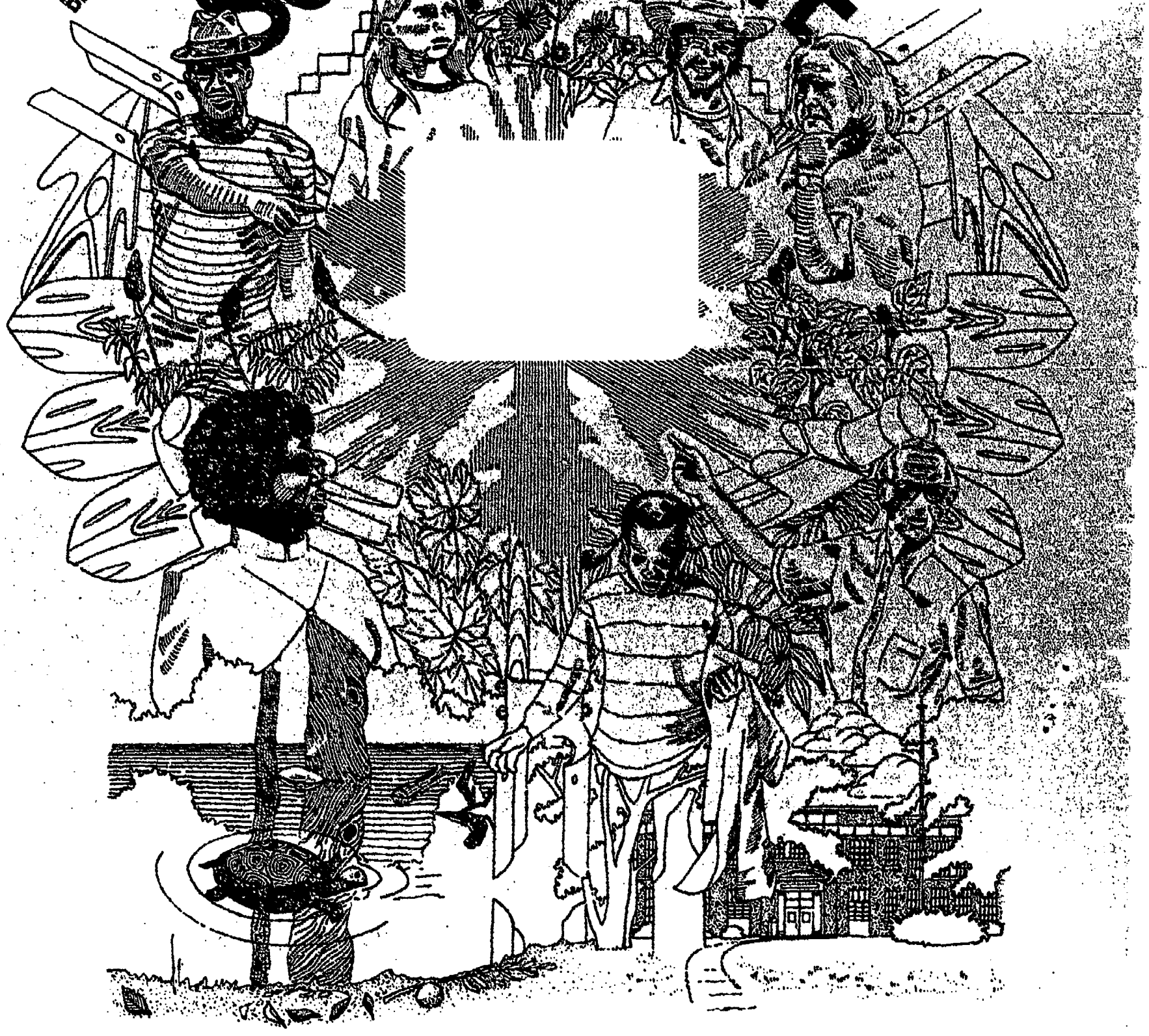
ABSTRACT

This handbook, designed primarily for use in the development of existing elementary school sites, has the overall objective of defining a process approach to the development of a school site for use in environmental education. This approach involves the student body, school personnel, and the community in the planning, development and use of the school site as a green island for school and community use. Specific objectives of the handbook are: (1) to establish a rationale for developing school sites for use in environmental education: ecological, instructional, economic, and community benefits; (2) to provide guidelines for organizing a school site development effort; (3) to point out pitfalls one may encounter in site development efforts; (4) to provide strategies, ideas, and techniques for teachers to use in order to draw the most instructional benefit from the development and use of the school site; (5) to point out ways to achieve the maximum number of spin-off benefits from the development of the site; and (6) to provide selected references to written materials and available institutional and human resources. This handbook is written with the belief that one motivated individual can rally the school and community interest and support necessary to cooperatively develop a school site. (Author/BT)

ENVIRONMENTAL EDUCATION AND YOUR SCHOOL SITE



A grant to the Open Lands Project from the Illinois Institute for Environmental Quality provided the basic funding for the development of this book.

Stemming from its interest in environmental education, the Project played a catalytic role in bringing the necessary resources together.

The Open Lands Project is a non-profit citizen association organized to enhance the quality of the environment of the greater Chicago region in three ways:

1) By the permanent preservation of open space in public hands through direct effort; through assistance to other groups; or, through efforts to protect and assure better use of existing public open space.

2) By assisting the public schools, local colleges and other educational institutions in creating programs on environmental problems, assisting teachers in increasing student awareness of environmental opportunities, and promoting the use of existing public open space as an environmental study area.

3) By serving as a resource center and referral agency for individuals, citizen groups, government agencies and private interests seeking information about environmental problems and opportunities, open space preservation, and related matters.

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and your School Site
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He who plants trees loves others besides himself.

anonymous

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Foreword

Although our public school system is one of the largest land holders in the state, too little consideration has been given to the impact which the conditions of school sites have on the environmental quality of our communities, and the potential resource which the school site offers for environmental education.

It is in response to the growing interest of educators and their increasing awareness of the importance and potential of a progressive school site development program, that this handbook has been written.

Preface

This handbook has been written on the basis of the author's own experience with school site development projects in the states of Illinois and Michigan, as well as the research of school site development efforts in the state of Michigan where, for over the past ten years, school districts have been involved in extensive school site development projects.

The research and writing were done pursuant to a grant from the Illinois Institute for Environmental Quality to the Open Lands Project, Chicago, Illinois.

Acknowledgments

The author acknowledges the many individuals and organizations whose dedicated efforts made the writing of this handbook possible. Sincere appreciation is expressed to the following people who, in sharing a common vision of what a school site can become, contributed their time, talents and energies.

Elma Douglas, Julien Drayton, Tony Filip, Ora McConnor, Richard C. Wnek and the students and staff of the Raymond Elementary School, Chicago Public Schools;
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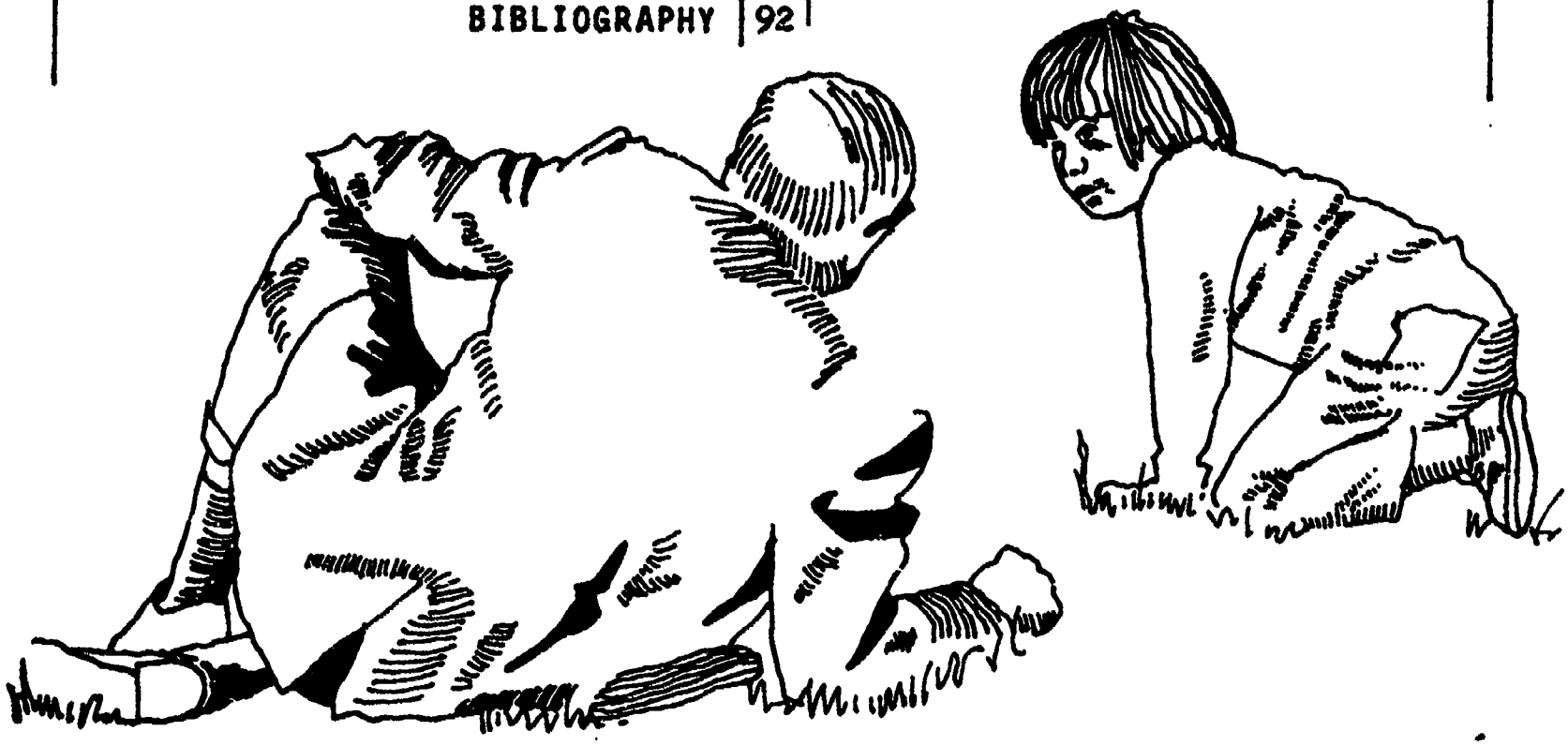
Dorothy Cox, Norman Marsh, Tim Speyer, and Steve VanMatre for the use of their material;
Carolyn Kennedy for her photographic assistance and materials;
my family, and especially my wife Diane for her editing, patience, and love.

My wish to you the reader is that, in following the process of school site development, you have the good fortune to meet, work with, learn from, and share the experience with as many wonderful people and groups as I have.

Contents



"We travel together, passengers on a little spaceship, dependent on its vulnerable supplies of air and soil . . . preserved from annihilation only by the care, the work, and I will say, the love, we give our fragile craft."

--Adlai Stevenson II

Introduction

Earth Day is a memory; ecology is now a household word. There are state statutes mandating that environmental education be taught in public elementary and secondary schools, and state plans have been written. Now, what does an educator do to bring environmental education and students together?

While a completely satisfactory definition of environmental education has not been established, it is generally accepted that the emphasis must be on a process approach which will produce a citizenry that is knowledgeable about the environment and ecological principles, has the skills necessary to take effective action to help solve environmental problems, and is motivated to do so.[1]

RATIONALE

In less than half a century our nation has changed from a predominantly rural to a predominantly urban society. At the same time, our technology and affluence have made us more comfortable at tremendous cost to the environment, upon which all life depends. If we are to respond to these conditions, we must cultivate a new set of attitudes toward our earth and its resources.

Our earth is like a spaceship. It is a relatively closed system containing all the necessities for life (soil, water and air) we will ever have. This "spaceship earth" concept can do much to help us recognize that the land around us is not simply land to be built upon, but that it is land which must be carefully husbanded because it is an integral part of our life support system. A spaceship earth philosophy demands more than simple recognition, however. If our citizens are to make informed environmental decisions and consumer choices, they must also be provided with an experiential base that will equip them with the knowledge, motivation and skills to deal with increasingly complex environmental problems. Our public school systems have a unique opportunity and responsibility to provide this experiential base. An effective way in which schools can do this is through the process of school site development.

[1]U.S. Dept. of Health, Education and Welfare. Office of Education, *Environmental Education Handbook* (Washington, D.C., 1972), p. 3.

OBJECTIVES

The overall objective of this handbook is to define a *process approach* to the development of a school site for use in environmental education, i.e., an approach which involves the student body, school personnel and community in the planning, development and use of the school site as a "green island" for school and community use.

Specific objectives of the handbook are:

- to establish a rationale for developing school sites for use in environmental education: ecological, instructional, economic, and community benefits;
- to provide guidelines for or-

ganizing a school site development effort;

- to point out pitfalls to avoid which you may encounter in your site development efforts;
- to provide strategies, ideas and techniques for teachers to use in order to draw the most instructional benefit from the development and use of the school site;
- to point out ways to achieve the maximum number of spin-off benefits from the development of your site; and
- to provide selected references to written materials, and institutional and human resources which are available to assist you in your efforts.

SCOPE

While the handbook is designed primarily for use in the development of existing elementary school sites, the process approach which is outlined can be easily adapted to upper grade levels and/or to the development of newly acquired sites. The sections covering the rationale (Chapter I), the third case study included in Chapter 3, the model school district policy (Chapter 5), and Appendix C should be of special interest and assistance to the latter.

This handbook is written with the belief that one motivated individual can rally the school and community interest and support necessary to cooperatively develop a school site into a model of sound environmental practice and a living laboratory for learning. Whether it's in the heart of Chicago, the open prairie or the suburbs of Springfield, development and use of your school site can serve as a vehicle for environmental education -- an education of the very best kind, because it will be by experience.

Chapter One

Why School Site Development?

...8 o'clock Monday morning. You pull into the parking lot, walk through the door, sign in. Another week of kids, papers, books and learning begins in your school, which is located on your school site, which is part of the thin membrane of the spaceship earth on which all life depends.

Pick up almost any recent magazine or book and you'll probably find the words "ecology," "environment," and the need for a "land ethic" and building a better environment mentioned. Now take a look outside a classroom window. Is your school site a model of the kind of environment which our generation must set about to build--or is it a model, instead, of what careless attitudes toward land and our environment have brought about?

Sad to say the state of most school sites does not reflect the concern which our citizens have today for the environment. Environmental education that talks of oil spills, polluting smokestacks and a land ethic without addressing itself to its own corner of the world is missing the point entirely. If environmental education is to be taught effectively, the school site itself should be a model of sound environmental practice, a model which can be used in developing the knowledge and problem-solving skills needed to work toward the solutions of the many environmental problems which communities everywhere face.

Take another look at your school site. Is it a model of sound environmental practice? Following are some facts and problem areas which may, perhaps, indicate the need for a school site development project at your school.

ENHANCEMENT OF THE INSTRUCTIONAL PROGRAM

One of the primary purposes of a school is education. Because schools have limited resources and budgets, educators should make the best use of what they have in developing their educational program. Development of the school grounds for educational purposes is not an additional financial strain. No matter how big or small, the site already exists. There are two ways in which educators can capitalize on this existing resource.

...through Development of the Site

One of the fundamental tenets of a school site development effort is that the process of developing and maintaining the site can be as much an education, or perhaps even a better education than what is formally taught through use of the school site. By using a process approach to the development of the site (i.e., an approach which involves the student body, school personnel and community in the planning, development and use of the school site), students can develop much needed problem-solving skills, as well as build up their self-concepts of what they can do and be.

...through Use of the Site

There is little dispute among educa-

tors that teaching via experience is the best way to teach. Students also are in complete agreement. The problem has always been and still is the delivery system. How can a teacher provide a wealth of learning experiences given the realities of the classroom, the crowded curriculum and the tight school budgets of today?

Because environmental education is about man's relationship to his environment, part of a student's education should include experiences in and with the outdoor environment. Although field trips and school camping have become widely accepted as ways to provide effective environmental learning experiences outdoors, the expense of renting a bus, justification to and approval by the principal and/or district superintendent, and other red tape involved make such experiences, at best, an infrequent occurrence for a fortunate few.

There is, however, no red tape or cost involved in the use of the school site once it has been developed. It has, in fact, already been reserved--a priori, twenty-four hours a day, 365 days a year -- for educational purposes. It's there at the doorstep whenever the lesson of the day or student interest calls for it, and is familiar to teachers and students alike. Use of the school site is neither an expensive simulation nor a second-hand experience; experiences with it are exciting and real.

At your doorstep...whenever the lesson of the day or student interest calls for it

All aspects of the curriculum can be enhanced by the experiences which a well designed school site offers. The many formal and informal learning experiences which can be developed, therefore, can provide a significant addition to the school's instructional program. The outdoor education movement pioneered many effective teaching practices which can be used to teach in the out-of-doors. "Lands for Learning" became a motto which L. B. Sharp, a pioneer of outdoor education, made famous. Teach indoors that which can best be learned there, and teach outdoors that which can best be learned in that environment, is a motto promoted by Julian Smith which can be put to more practical and effective use if part of the school site has been developed as an outdoor classroom.

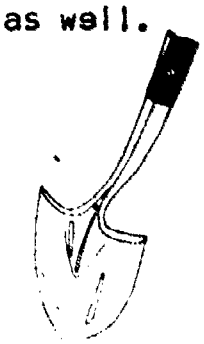
ECONOMICS

School boards have both a legal and a social obligation to their communities to be good neighbors. Research in Texas has found that well maintained and designed parks stimulate better maintenance of housing units surrounding the park. It was also found that elementary school/park combinations increased the value of surrounding houses and the tax revenue faster than any other park or park complex.[2] In Michigan and Wisconsin, another study has found that property values and property tax revenues rise much faster around open-space school sites than around matched schools which have not set aside the land for the community. Some of the specific conclusions of this study were: that the development of the site for educational and community use had a significant effect upon the market sale prices of houses around the elementary sites studied; the size and the degree of site development positively influenced the value of housing units as far as four blocks away; and that over a thirty year period, a well developed open-space site would generate sufficient addi-

[2]William G. Wagner, Ben H. Evans and Matthew A. Nowak, *Shelter for Physical Education* (College Station, Texas, 1961), p. 30.

tional tax revenue to pay for the cost of the additional land and its development and maintenance. Even small, well developed school sites exerted a positive influence upon property value. This study also found that persons whose houses adjoin "green islands" move much less frequently than others.[3] Mobility in our society is a cherished right, but every teacher knows how disrupting teaching in a highly mobile community can be.

Both of these studies indicate that the idea of a school site as a "green island" is not a lavish proposal or something to be considered as an extra. Rather, it is a sound investment in the community which will pay back not only the initial cost, but will reap a harvest of other benefits as well.

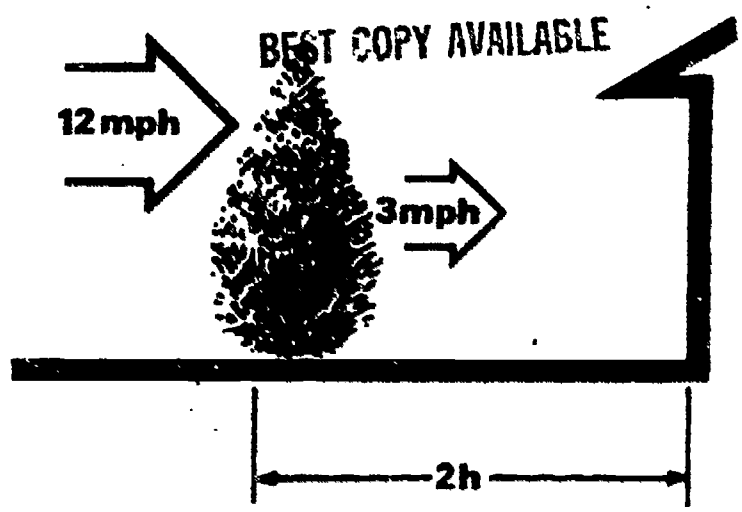


IMPROVEMENT OF THE MICRO-CLIMATE

In traveling across the countryside of Illinois, one can easily pick out the residences of the early pioneers. One sure sign is the windbreak of evergreens located on the windward side of the house and a number of large deciduous trees in the front. Few of our forefathers would have spent these lavish amounts of time and money on landscaping if there wasn't a sound, practical reason for doing so. In most school districts, however, landscaping of schools is a low priority item and is usually the first thing to be cut from the budget.

How effectively have trees and vegetation been used on your site? Because of a brief period of relative energy surplus, we have often forgotten some of the more common sense things of life. As a result, many school buildings are left exposed to the natural elements. Without windbreaks, the windchill factor has a very real impact. For example, the chill of a

[3]Karl Grube, *Economic Influences of Elementary School Sites on Residential Property Tax Revenue in Selected Urban Neighborhoods* (Ann Arbor, Mich., 1973).



BARRIER WILL REDUCE WIND VELOCITIES NEXT TO BUILDINGS

50°F. day with an 8 m.p.h. wind is equivalent to that of a 32°F. day with no wind. Trees planted in windbelts can reduce the wind velocity by 80%.[4] In summer, natural vegetation has an opposite effect. Due to the tremendous amounts of heat energy used by plants in the biological process of transpiration, hundreds of gallons of water are passed into the atmosphere. One large tree thus provides the same cooling effect as several large air conditioners. Further, deciduous trees located on the south side of the building effectively serve as "automatic" window blinds, letting in the warmth of the sun's rays in the winter and providing shade and cooling in the summer.

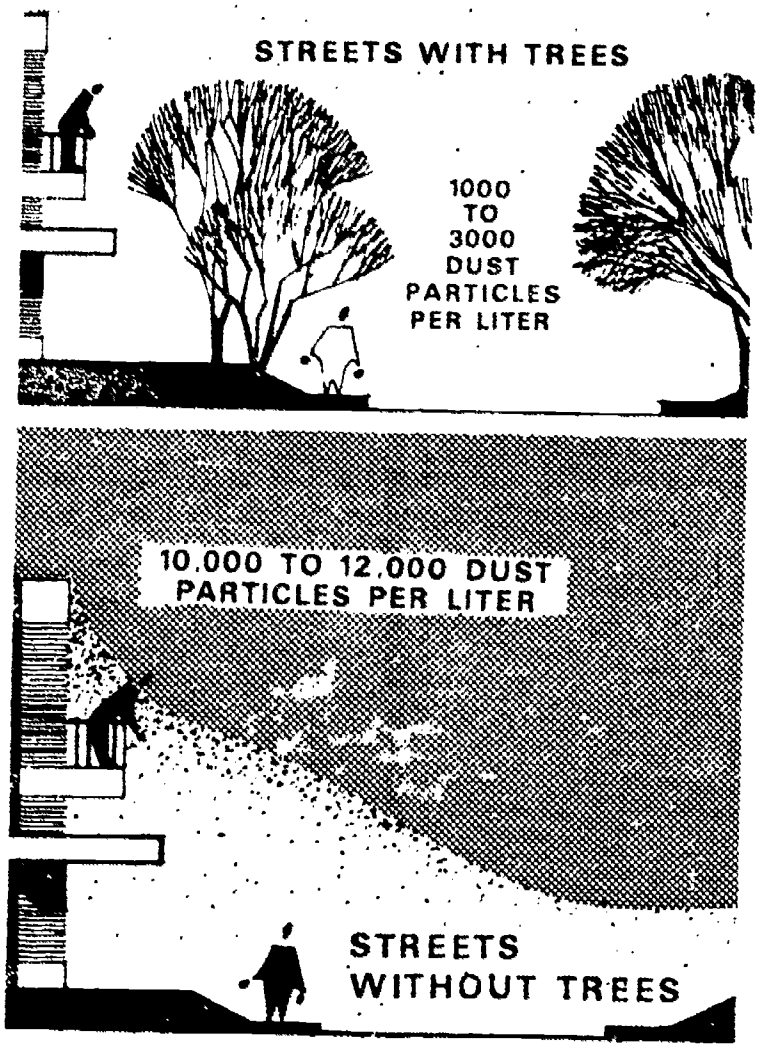
Translated into dollars and cents, it makes a great deal of financial sense to utilize alternatives to large expenditures made for such things as drapes and blinds, heating and air conditioning. Not only will this mean financial savings (research indicates up to 30%[5]), but, by landscaping a school site in a way which takes advantage of nature's climate control mechanisms, precious fuel supplies will last longer and there will be less air pollution from the heating and air conditioning of our schools.

[4]William S. Hendon, et al., *The Sociological and Economic Impact of Urban Parks in Dallas, Texas* (Lubbock, Texas, 1967).

[5]Gary O. Robinette, *Plants/People/and Environmental Quality* (Washington, D.C., 1972), p. 99.

AIR AND NOISE POLLUTION

How have trees and vegetation been used on your site to control air and noise pollution? Research studies have found that the amount of dust bordering a tree-lined street is 75% less than on a street without trees; and that trees can reduce concentrations of sulfur dioxide by 70%, nitric oxide by 67%, ozone by 40 - 60%, ragweed pollen by 80%. Plants can also reduce the sound of traffic noise by 8-10 decibels. Trees can even act as a shield against radioactivity. Synopses of the specific research studies which document these rather startling statistics can be found in the publication, *Plants/People/ and Environmental Quality.*[6]



AESTHETICS

Economic and environmental research data which is now becoming available points to the importance of well developed and well maintained school sites. The importance of beauty should, however, be a reason in itself. The beauty which a single large tree can add to a site, for example, reflects a unique quality of life. The sound of wind and rain on foliage, the rhythm of sunlight and shadows playing on the foliage, the scent of flowers, the fall of autumn leaves, are all aesthetic experiences which trees and vegetation provide. They also are sculptural features which soften the environment and provide much needed spatial relief. A school and its site should be a beautiful place because it houses our most precious resource, our children.

COMMUNITY USE

A public school site is land which has been taken off the property tax roles, and is available for public use. In many areas it is also part of a scarce commodity -- open space. Presently, however, most public school sites are used by the community to only a fraction of their potential.

Have your students survey the extent to which your school site is being used. A conservative estimate is that school sites are used to only about 10% or 15% of their potential.[7] Depending upon the availability of other alternative public land in your community, this may or may not pose a problem. The "unused potential" of most public school sites is, nevertheless, a waste of public dollars in that a well designed and developed site should attract students and community members for educational and recreational purposes during *and* after school hours and on week-ends as well.

COMMUNITY RELATIONS

There are few schools left which are so stable that their educators

[6] *Ibid.*, pp. 50-56.

[7] Russell E. Wilson and June S. Brown, "Schools Can Be Green Islands," *Michigan Education Journal*, vol. 42, no. 16 (Apr. 1965), p. 20.

don't have to worry about their relationship with the community. While this may be more a problem of human relations, neighbors who ignore or are unwilling to report or help curb school vandalism, for example, make the problem an environmental one, e.g., boarded up windows, unsightly graffiti. By involving the community in the development of the site, the school can be a symbol as well as a source of community pride.

The concept of private property has become so ingrained in our society that public property is considered to belong to the government.[8] The school site is thus viewed as something which belongs to school people. By opening the door to the community through a school site development project, schools can help to break down this fragmented view of our world. A citizenry which feels a sense of ownership and stewardship of its public land (and among the most visible public land is our school sites) is a long way down the road toward a spaceship earth perspective in which everyone feels a part of, and thus a responsibility for, the total environment.

How this translates into more tangible factors such as the passage of bond issues is an item of speculation, but experience of school systems which have maintained an open-door policy to the community would indicate a positive correlation.[9]

As a case in point, an elderly lady whose property bordered the Lincoln Elementary School in Coldwater, Michigan, came to an open meeting at which the development of the school site was discussed. Her response to the presentation on the plans for the site was (as recollected), "I've been voting down school millage requests for twenty years, but now you're doing something I can identify with." Whether or not she voted for the next school millage is not recorded, but she did make a sizeable donation of several hundred dollars that evening to the project.

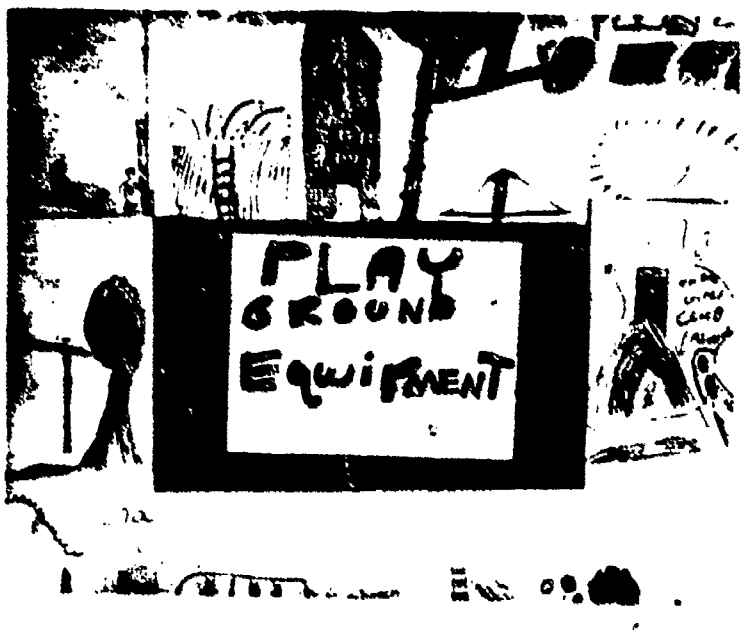
PLAY AREAS

Schools are built for children, but the site and play areas seem to be more often than not either built for the convenience of the maintenance man or designed by planners with little or no communication with the youth who will use them. Studies at the University of Michigan have indicated that the top four site preferences of youth, when asked, are a water area, wildlife, trees and change in topography.

The importance of a rich and diverse environment for the healthy development of children has only been recently realized. What does the environment

[8]Russell E. Wilson, et al., *School Site Research Project* (Unpublished research proposal).

[9]Elmer Wells, *Vandalism and Violence: Innovative Strategies Reduce Cost to Schools* (Washington, D.C., 1971), p. 47.



What do the children want? What do they need for healthy physical development?

of the playground on your site look like from a child's viewpoint? Are there numerous different and exciting things which keep children active and help them to develop essential psychomotor skills, such as hand-eye coordination?

Many schools now have learning disability labs where children go to walk on balance beams and the like, to improve their psychomotor skills. It seems almost a moot question to ask why something like a balance beam couldn't be permanently installed on the school site as a part of the playground apparatus, which would invite children to its use not just on a scheduled basis but every day and weekends as well.

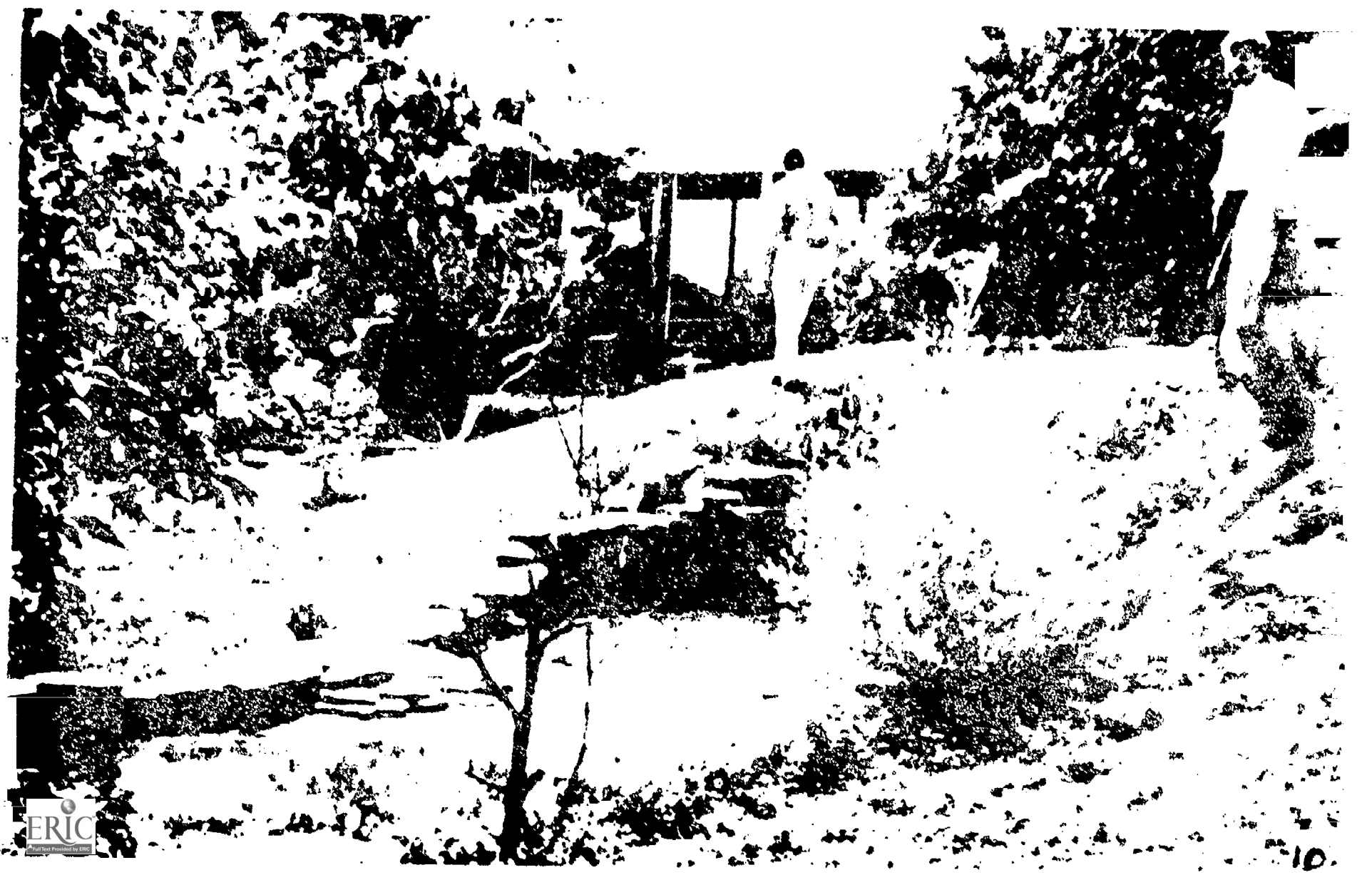
This question is seldom asked, however. Instead, thousands of dollars are being spent on the storage and purchase of the equipment necessary to run an indoor version of what could perhaps take place more efficiently outdoors on the site. Such equipment for outdoor use can be bought commercially, but the expense of such items has led many schools to build their own from telephone poles, tires, and other readily available materials. Details covering the organization and development of improvised play areas can be found in Appendix E.

Take another look at your site during the next recess period. Is the playground, in fact, an environmental problem? The fights, bloody noses and boredom which result from a playground's sterility are as much an environmental problem to children as the air pollution alert that cancels recess.

By now you realize that school site development is discussed here in its broadest sense, and that it entails much more than just the development of a nature area for the science teacher. Environmental education must address itself to all problems which occur at the interface between man and his environment. It is up to you to identify which problems are most crucial at your school. The second step is then to do something about them. To paraphrase a statement made by Mayor Daley of Chicago: it's easy to criticize, but do you have a plan for a better idea? The following chapters will help you to formulate such a plan.

SCHOOL SITE DEVELOPMENT Suggested Time Table for the First Year	
Sep, Oct	gather information; obtain initial approval; contact resource people
Nov	conduct site inventory; develop site educational specifications
Dec, Jan	develop master plan; obtain final approval
Feb, Mar	raise support and money
Apr, May, June	begin implementation of master plan

Remember, take time. Two to three years to get rolling is not unreasonable.



Chapter Two

The Process of School Site Development

Because of its more technical nature the casual reader may wish to skim this chapter, returning to it for a thorough reading at a later time to digest the practical guidelines it contains. Due to its importance in the site development process, however, the contents of this chapter should not be neglected.

How you go about developing your school site is just as, or perhaps even more important than *what* you develop. A project in which only one or two persons do the work may develop a functional site, yes, but with a lot more sweat and a lot less education and effectiveness than if more people had shouldered the joys and burdens of the effort.

By involving students, teachers and the community in the process of developing the site, the experience itself can become an environmental education lesson of the very best kind. The problem-solving skills which a school site development effort can cultivate are the same skills needed to work toward the solutions of the many environmental problems which communities everywhere face.

Vandalism is another key consideration. As a rule of thumb, the more people who meaningfully participate in the development effort, the less likely it is that vandalism will occur or, if it does occur, the more likely it is that it will be reported and the vandals apprehended.

The importance of student, teacher and community involvement in the process cannot be overstressed.

Each school and each school site development effort is unique. There is, therefore, no cookbook approach to a successful development effort because the ingredients (i.e., who does or approves what) may differ. The *process*, however, remains the same. Following is a breakdown of that process.

Step 1: Initiation of the project
Step 2: Securing initial approval and backing of administration
Step 3: Formation of a school site development committee
Step 4: Inventory of site resources by the committee and by a resource specialist
Step 5: Development of educational specifications for the site
Step 6: Development of a master plan
Step 7: Development of a plan for securing human and material resources, and fundraising
Step 8: Presentation of the master plan for approval
Step 9: Implementation of the master plan
Step 10: Continued development and maintenance of the site

STEP 1: INITIATION OF THE PROJECT

The most important step in any project is the initial one. It has been said that nothing good was ever accomplished without someone first getting excited about it. A school site development project can be an exciting and meaningful experience for the entire

school community, but it won't just happen. It takes people.

STEP 2: SECURING INITIAL APPROVAL AND BACKING OF ADMINISTRATION

Talk to other members of the staff at your school who may have an interest in such a project. Pass this publication around, exchange initial thoughts and then, together, approach the principal and school board for initial approval to proceed with the planning phase. (Note: Board approval to begin the planning phase may not be necessary in all districts, but it is recommended.) As an assist in securing this approval, provide them with some of the available literature on school site development. Again, this publication, along with other available literature on site development should serve the purpose.

In addition to seeking administrative approval, consult your chief custodian regarding his feelings toward a site development effort. His support will be very important in the planning, development and use of the site.

After initial go-ahead is obtained, present the idea before the student body and staff, either through open discussion, slides or a film. One of the two films listed in the Selected References, Introducing the Idea, should be appropriate.

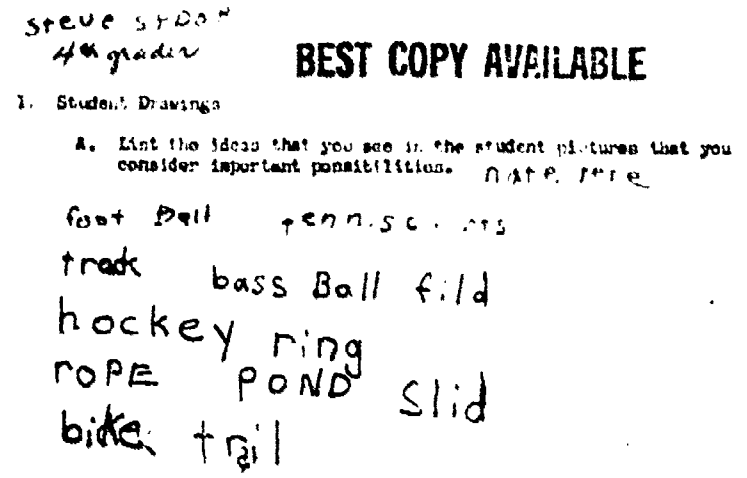
STEP 3: FORMATION OF A SCHOOL SITE DEVELOPMENT COMMITTEE

The next step is to form your school site committee. The committee is much more than just a formality, so it's worth the extra time and effort to recruit persons who are both interested and representative of your school and its operation.

Composition of Committee

Students, faculty representing the various disciplines, administration, school maintenance staff, parents and community resource persons should all be included within your committee. Having a board of education member or local businessman on your committee can also be an important asset.

Participation of students is much more than a token gesture. After the idea of site development has been presented to the school, representatives from each grade level should be elected. Students from third grade on up (though sometimes even younger) have been found to make the most meaningful contributions to the effort. As the primary target of every school effort should be the children, it is indeed heartwarming to see the way in which students respond to the opportunity to become involved when their contri-



butions are expected, welcomed and respected.

Duties of student representatives should include more than just presence and participation in the meetings. They should report back to their constituency after each meeting as well and, in the most real sense of the word, be representatives. Students are usually more familiar than anyone with their school sites, thus the trouble-shooting insights which they can bring to the analysis and location of facilities on the site is invaluable. For example, in the development of one inner city school site of limited size, a problem arose in trying to fit everything, including the one existing ball diamond, into the site. A baseball-playing fourth grader made the unexpected suggestion that the ball diamond be divided up into other uses. With 2,000 children in the school, the ball diamond had become a source of bitter fighting among rival groups competing for the playfield. By dividing up the ball diamond into basketball courts, climbing and quiet play areas, the available area could serve more students in a much happier and healthier way.

Another important contribution which students usually make is their parents. There is no better way to get parents out for an evening meeting or a Saturday workday (detailed in Step 9) than to have a son or daughter who is interested and involved.

A key person on your committee should be your custodian. Don't be hesitant about approaching your custodial staff. Too often we remember the custodian only for the times he has said "no" to school activities. By emphasizing the positive and explaining the potential that a school site development effort can have in changing the attitudes of children toward school property, you may gain an invaluable asset to your effort. Custodians have a great deal of practical experience to contribute, and have the contacts and access to tools and materials which are so necessary to the success of the project.

Community participation is another vital ingredient. Without community approval and support, the guidelines presented here cannot be successfully implemented. It is important to remember, however, the necessity of involving community people who have an interest in the problem *and* are willing to work. Simply because an individual has been a leader in other past community activities does not necessarily mean that he or she will be a good member of this committee.

Use of high school or college students on the committee may help to provide extra energy if that is needed, but one must be careful to keep the community informed of their activity and working in cooperation with them. They will otherwise view the students' work as being only academic, rather than an investment in which the community can share.

It is vitally important to identify a professional resource person to work with your committee in the development and execution of your project. Ideally a professional landscape architect who has had specific experience in developing school sites as defined in this handbook should be retained to work with the committee. Few school districts, however, have developed the resources to employ such a person, especially for existing sites. Your local Soil Conservation Service agent has had specific training in site development and is willing to work with local school districts in site development efforts. He can help in the selection of suitable sites, develop a conservation plan for the area, as well as provide technical advice and

inservice training for teachers.[10] The local arboretum is another source from which you may be able to secure the necessary assistance.

Other potential resource persons are land planners who may reside in the community or who are connected with your school as a parent or a spouse of the staff. If your school is part of a school-park complex, the park district may provide still another route for assistance. In any case, the review and input of a professional land planner is vital, as he will shape your plans into blueprints for success off the drawing board as well as on.

Time may not permit the attendance of your resource person at all meetings, but it is important to gain the perspective which such a person can bring in developing the initial ideas for the site and in finalizing them for presentation.

A source of "historical" professional advice available to existing schools is the original plan for the site developed when the school was built. In many instances the money for implementation of the landscape plan never became available. As a result, many well designed plans were never accomplished. This is not to suggest that these plans should now be implemented as originally designed, but rather that the plans may prove helpful in organizing and structuring your site development effort, particularly as it relates to the area immediately adjacent to the school.

Committee Guidelines

Meet often, but don't committee yourself to death. Once every two weeks is a good time span. Use group dynamics techniques such as brainstorming or writing ideas down on large sheets of paper, so everyone participates as much as possible. Have an agenda of tasks to be accomplished and try to get materials out to committee members prior to each meeting. Keep notes faithfully and, just as important, appoint an "official photographer" (or ask the camera club, if one exists) to keep a pictorial record of the development project. Before and after shots, both slides and black and white glossies, will be invaluable assets in promoting and publicizing, as well as in enjoying and remembering a great experience.

Keep in mind that the scope of your committee, no matter how together and how polished, is still only advisory. Boards of education and/or designated school officials have the legal responsibility and the final authority over what can and cannot be done. The committee's effectiveness will, therefore, be largely dependent upon the case which is developed for the project.

As was stated earlier, each school and school site development effort is unique. In order to help your committee surface a strategy which is best suited to your situation, take the time to make use of an effective tool, a "force field analysis," which will help you to get a clear picture of your goals, strengths and weaknesses, and your restraints. A copy of an analysis sheet is included here for your ease of reproduction.

Keeping in mind the various steps outlined in this chapter, complete a form yourself initially in order to get the feel of the way in which it works, but bring only blank copies to the meeting for analysis by your entire school site committee. By having each committee member complete a form and by then sharing their analyses, not only will you have a broader perspective, but people will begin to feel more a part of the effort.

In developing a strategy from the results of your analysis, keep in mind that it is usually easier and more effective in the long run to *deal* with your restraints than it is to totally ignore them and try to build up additional support to compensate for them.

[10] "Policies for Outdoor Environmental Education Laboratories," Information Memorandum-IL-5 (Champaign, Ill., Mar. 2, 1971).

Problem

What is the current status of your effort?

Goal

What would you like the situation to be?

Driving Forces

(e.g., self-commitment to the environmental movement)

Restraining Forces

(e.g., current involvement in too many other projects)

Self

Rank them according to the ones you'd go after first.

(e.g., opinion leaders are on your side)

Others

(e.g., the administration is negative to the idea)

(e.g., student body is all for it)

Situation

(e.g., available money is limited)

(e.g., conduct a fundraising drive to raise the additional money and build support)

Possible Actions

Have Access to:

Resources

Need:

STEP 4: INVENTORY OF SITE RESOURCES BY THE COMMITTEE AND BY A RESOURCE SPECIALIST

An inventory of the natural and historical resources of the site should be made with the assistance of your resource specialist. The purpose of the inventory is to find out what features exist on the site that can be used in the educational program of the school.

Characteristics which should be noted in the inventory include the topographical features (land forms), soil, vegetation and natural areas, wildlife habitats, water areas and sources, as well as historical remnants such as old interurban line roadbeds, orchards or grape arbors and the like. Potential sites for ponds, and project areas for items like weather stations should also be noted. The Soil Conservation Service has developed a three-page site analysis form which lists all the information to be gathered in the inventory (see Appendix D). The completed inventory will supply the basis for developing the educational specifications for the site.

An historical record of man's use of the land may be found above and below ground.

Background information which students can gather in preparation for the site inventory includes information on the history of the area, geology and vegetation of the site, and the potential number of students and community residents who will be using the site. For example, what was on the site before it became school property? What is the history of man's use and manipulation of the land on which the school is located? By having students gather this information either from city records or by interviewing long-time community residents or teachers, not only will you be more aware of what to look for by way of historical remnants when making a site inventory, but an educational process will be established which will enable students to put the use of the school site into the historical perspective of man's relationship to the land.

The school site -- a life-size teaching aid with no storage or retrieval problems

STEP 5: DEVELOPMENT OF EDUCATIONAL SPECIFICATIONS FOR THE SITE

Educational specifications have long been used by educators as a means of communicating to building architects the kinds of educational spaces needed inside a building. Seldom have educational specifications been developed for the school site. Their development for the site is of prime importance, however, for they will convey the types of teaching stations (covered in Chapter 4) and/or outdoor areas desired.

Outdoor study areas can be developed for science, math, art, dramatics and all other aspects of the curriculum. Educational specifications for the respective subject areas should be developed by the various curriculum committees of your school. This process will help to broaden your base of support, as well as increase the involvement of others.

Educational specifications should be developed for resources which are already part of the site, as well as for areas of the site which could be de-

veloped. In writing the specifications for your school site, ask yourself two questions: What is there on the site which should be retained, utilized and / or perhaps modified? What additional things would you like to see on the site?

Where applicable, educational specifications should cover the following points:

- The objective of the activity associated with the space
- How the space will be used (i.e., by groups, individually)
- How much area is needed
- The spatial relationship to other areas on the site (i.e., what, if anything, should it be near or far away from)
- What sort of special equipment will be used that may affect the location or design of the space.[11]

Following are sample educational specifications for the development of instructional areas or teaching stations on school sites.

- *A compost* which individual students and classes can use to learn about and practice natural biogeochemical recycling should be constructed in an area hidden from public view (either by location or by plantings), but near the kitchen, garden area and a water source. It should, however, be far enough away from major activity areas in the event a foul odor results due to poor management.
- (Desired number of) *flower planters* for use by (desired) grade(s), which are wide enough to permit young children to work on either side but narrow enough to allow a child to reach the center from the edge, should be located so that the natural beauty of the flowers is displayed to the public but far enough off the main approaches to the school so that vandalism is not invited. They should be near a water source and, if possible, visible from inside the building by classes that will be involved in the gardening program.
- *A weather station* for the study of the atmosphere and the associated problems of air pollution should be located, where possible, a minimum distance of 50' from buildings and dense vegetation. It should be located in full public view to discourage vandalism, with enough surrounding open area to accommodate a class of 35 students.

(Guidelines for the development and/or construction, as well as for the instructional use of the above and other teaching stations, are contained in Appendix A.)

Because you have read literature on school site development, it may be easy for you to come up with various suggestions for the curriculum committee as to what should be done. It is important, however, to allow others to come up with "their own" ideas, despite the fact that you may already have them in mind. Every individual has certain interests and strengths. By working up the ideas for the site together, the interests and strengths of the various persons will complement each other. In addition, because each individual will feel more a part of the process, he or she will be much more likely to follow through on ideas. For example, an art teacher who feels it was his or her idea to develop an outdoor area complete with benches, will not only be much more likely to accept responsibility in developing the site, but will also be more likely to use the area than if the idea for development and later use of the art area had been suggested *to* him or her.

Simple, common sense one might call it, but common sense too often gets lost when the excitement and momentum of getting something done starts rolling.

[11] *Guide for Planning Educational Facilities* (Columbus, Ohio, Sep. 1969), p. 49.

STEP 6: DEVELOPMENT OF A MASTER PLAN

There are five aspects which should be covered in your master plan:

- Site Plan (a blueprint or layout of the site)
- Instructional Use
- Community Use
- Maintenance
- Implementation

Site Plan

Based upon the site inventory and the educational specifications developed by the various committees, your resource specialist will be able to develop a site plan. In developing this plan, consideration should be given to the importance of keeping maintenance work down to a minimum via good design and by initially limiting the size of high maintenance areas. (Note: Vegetable or flower gardens require more upkeep than natural area habitat groups such as wooded areas, which require little or no maintenance once they are established.) While a formal review of the site planning process is not intended here, the following strategy will help you to make the most instructional use of the site planning phase of your development effort. (For a formal account of the site planning process, see Appendix C.)

Landscape architects and other land planners spend many years developing the skills necessary for the planning and development of land. In order to gain an understanding of the planning and development process, students can and should participate in the planning for their school site. The desired end result is not to have students draft the actual site plan, but rather, through this process, to establish a professional-client relationship in which they can gain insight into the decision-making process and importance of *environmental* planning.

Reference was made in *Step 4* to ways in which students can assist in the preliminary inventory and analysis of the site, for use in development of the site plan. Another way to help students gain an understanding of the site planning process is to ask your resource specialist to give a brief presentation on environmental planning to the student body. In order to make use of his limited time, this could be scheduled for the day on which he will be at the school to conduct the site inventory. Slides of the school site, a large scale model made by students, or a map of the site should be made available in order that abstract concepts can be presented using scenes with which the students are familiar. (Note: Recording this presentation on slides, tape and/or film can make an excellent teaching aid for students to use in environmental studies in the future.)

A student-made model helps bring blueprints to life.

Professional planners are becoming more and more aware of the importance of surveying what it is their client really needs or would like. Another way in which schools have involved students in the site planning process is by having a class or small group devise, administer to all students, and tabulate a simple questionnaire to determine what the student body would most like to see on their site. This data, along with other information collected about the site, can supply valuable information for use in

developing the site plan. It can also be used in the request for support and approval of the master plan.

Depending upon the time commitments of your resource specialist, you may or may not be able to rely on his services for the drafting of the final blueprints of your site plan. If not, a drafting class at a local high school or college may be able to do the final mechanical work.

Instructional and Community Use

After a site plan has been agreed upon, outlines should be developed covering the ways in which the site will be used for instructional and for community recreational purposes.

Responsibility for development of an outline describing the ways in which the site will be used in the instructional program should be assigned to a separate subcommittee of the school site committee. Ideas for instructional use from which the subcommittee can draw are contained in Chapter 4. Upon its completion, the outline should be discussed at a faculty meeting, revised accordingly, and the final document distributed to all teachers. A supply should also be retained by the principal for distribution to new teachers. The final document should be revised as teacher, student and curricular needs change.

Plans for community use of the site should be made in cooperation with neighborhood groups and the local park district in order that facilities to be developed (such as barbecue pits, picnic tables, shelters) will serve community needs, and not duplicate what may already be available down the street.

Maintenance

An outline covering the way in which the various project areas on the site will be maintained should be developed by one or two members of the site committee including, or in cooperation with the custodial staff. Long term maintenance of the site will, of course, be carried out by the school's maintenance staff. Consideration should also be given to the fact, however, that teachers and classes may want to manage a number of areas on the site themselves as part of their instructional use of the site (e.g., a gardening or experimental test plot area). In making this consideration, the maintenance plan should not hinge upon the tenure of any individual teacher.

Suggestions for developing the specifics of the maintenance plan can be drawn from *Step 10* of this chapter, p. 27.

Implementation

A final component of the master plan should be a section covering its implementation. This section should first outline the various stages of implementation of the master plan, i.e., in what sequence various projects will be implemented and over what time span. The timing should be flexible and allow for different methods of completing the projects. Your resource specialist will probably take responsibility for making these determinations.

Secondly, all projects which are to be implemented in the development of the school site should be allocated into three categories:

- projects to be contracted out (e.g., asphalting, excavation)
- projects to be carried out by volunteer groups (e.g., Boy Scouts and Girl Scouts, P.T.A., etc.)

- projects to be carried out by students and school staff

STEP 7: DEVELOPMENT OF A PLAN FOR SECURING HUMAN AND MATERIAL RESOURCES, AND FUNDRAISING

After the master plan has been developed and an initial estimate of the total "cost" of the school site effort has been made, it is time to develop a strategy for securing the human, material and financial resources necessary to implement the project. This strategy should be developed before making your presentation to authorities for final approval of the master plan, for without it many questions directed to you and your committee at that time regarding the practical "how's," may be left unanswered.

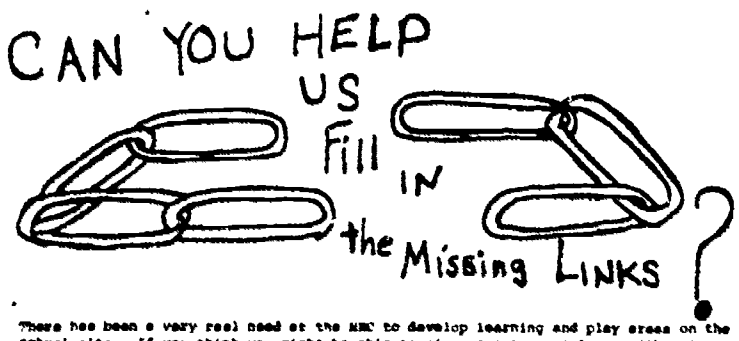
Human and Material Resources

Much of the excitement and learning comes from student participation in the development of the site; but in every project there are tasks which students and teachers cannot be expected to do for reasons of safety or simple physical and technical limitations. In certain instances these tasks may be farmed out to high school vocational education classes, community groups or to parents who have specifically needed skills. Construction of a weather station or installment of benches are ways, for example, in which high school classes have applied their expertise to the development of school sites. Youth groups such as 4-H, Scouts, Neighborhood Youth Corps, boys' clubs, local adult education or university classes have also been helpful. These groups are usually most responsive if the project is well defined as to what needs to be done, how it should be done and how long it will take. Given these three assurances, not only will they come and do a good job, but they will also come back for more.

In seeking help from local businesses and the like, individual letters to the appropriate persons will not only afford you personal contact with the community, but will also provide many opportunities for involving students in the process. A sincere letter of request for materials or help from a student will often bring a quicker and more positive response than letters from teachers or committees. Businessmen receive numerous requests for help from adults, but the simple language and sincerity of a child is much more difficult to ignore. If through this process no materials are donated, chances are you will be offered a discount on materials you must buy. A subcommittee of students can be assigned the task of selecting the best letters of solicitation from the classes involved.

An open letter to your community at large is another way of soliciting assistance. An example of such a letter is shown here. Don't expect to be overwhelmed with responses, however. You will secure a number of donations and make some invaluable contacts, but much of the justification for the paper and the effort is the communication made with the community that this is a project which the school and the community are doing together.

The local board of education should be able to assist with those tasks which must be contracted out or require the use of heavy machinery. While the board may not fund the project entirely, it is important that some sort of commitment be made by them either of materials or personnel. Like anyone else, a board of education is much more likely to follow up and keep an interest in a project in which they have made an investment. Be realistic, however, and



There has been a very real need at the HRC to develop learning and play areas on the school site. If you think you might be able to give us some assistance either in planning, actual construction, or donations/loans (materials, fund raising) please check the appropriate box(es) below and return this letter with your child tomorrow.

MAY 7TH THRU 12TH WILL BE SCHOOL SITE CONSTRUCTION WEEK. HOPE TO SEE YOU THERE.

School Site Action Group

Student's Name _____
Room Number _____
Helping Adult _____
(parent, guardian, friend)
Phone Number _____

I would like to participate in the following:

____ School site planning committee
____ Donate some time during school site construction week May 7th-12th
____ I know where you can get the following materials:

MATERIALS:

____ Old tires
____ Concrete pipes
____ Blocks of stone
____ Large rocks, beautiful ones for habitats--big enough not to be moved--many different kinds
____ Telephone poles
____ Railroad ties
____ Lengths of tree trunk
____ Old tree trunks, stumps

SKILLS:

____ Drive a truck
____ Gardening
____ Do carpentry
____ Painting

EQUIPMENT AND TOOLS:

____ Heavy truck
____ Front bucket loader
____ Trencher
____ Cultivator
____ Pickup trucks
____ Post-hole borer
____ Paint brushes, all sizes
____ Shovels
____ Spades
____ Pickaxes
____ Crowbars
____ Rakes
____ Sledgehammers
____ Wheelbarrows
____ Nails 3 1/2"-6"
____ Standards, heavy duty
____ Carriage bolts
____ Machine bolts
____ Lag bolts
____ Drills
____ Planers
____ Bits & extensions
____ Extension cords
____ Saws
____ Tape measurer
____ Trowels
____ Carpenters' horses

LIVING THINGS

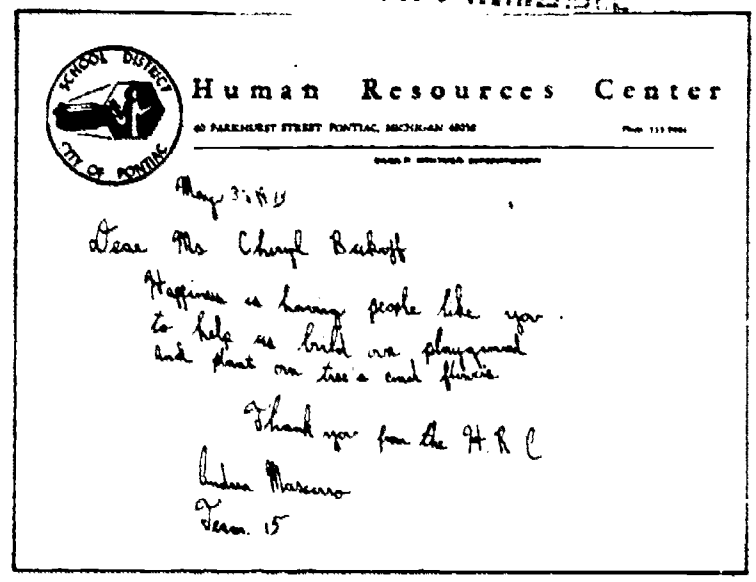
____ Trees & bushes
____ Flowers & bulbs
____ "Weeds"
____ Grasses & seeds of all kinds

---

work through the principal and school custodian in determining what resources are available through the board of education.

After the letters have been mailed and requests for assistance have been made, a subcommittee should be appointed to make sure that thank you letters are sent to all people who respond, even (in the cases where individual letters were sent) to those who say "no." Students can design and make the thank you notes themselves for use in the project.

The art of saying thank you is fast being lost in our super-efficient electronic world. Little things like asking students to write and appointing a subcommittee to send thank you letters may seem so unimportant that, in the hustle of the project, the burden is passed off to one person. It is, however, just as important to the development of a spaceship earth philosophy to involve as many students in this process, as it is in the planning and development of the site. Saying thank you is a very



direct recognition of the fact that the solution to any problem, especially to the environmental one, is not something which can be done alone. It requires that all of us work together.

Fundraising

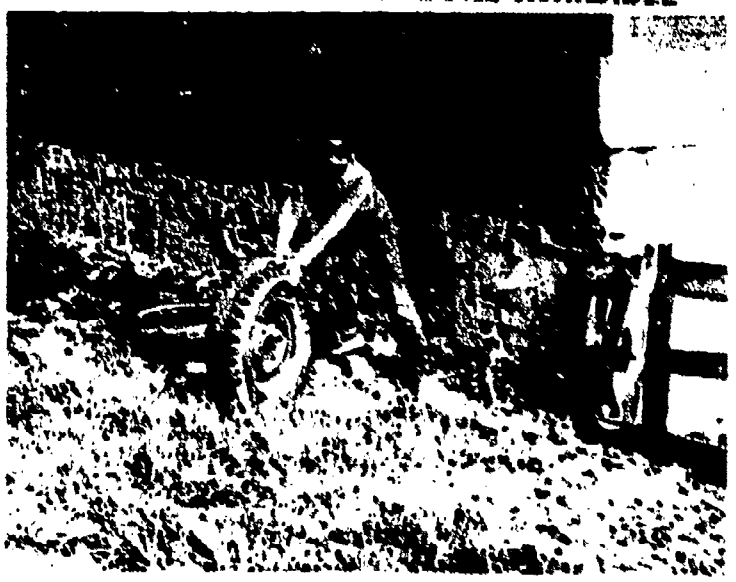
Almost every project entails certain cash outlays which cannot be met with existing funds or donations. Depending upon your school, there are several routes which can be taken to supplement immediate funds.

One route is to put your project "up for adoption." Local parents' organizations, garden clubs, and other such organizations respond readily to this type of project. Many times they are looking for annual projects to sponsor and/or are willing to dedicate the proceeds from annual fundraising efforts to a project such as yours.

Another method is to utilize a purely social event which has a tradition and involves the community. Rather than charging only enough to meet costs, double the charge with the understanding that the profit goes toward the school site development project.

Students themselves can easily be involved in fundraising efforts. In fact, the process of organizing, ordering, delivering and accounting can involve many exciting and effective lessons in math, salesmanship, social studies, etc.

The methods and extent of fundraising are limited only by one's imagination and energies. Conventional ways in which schools have successfully raised



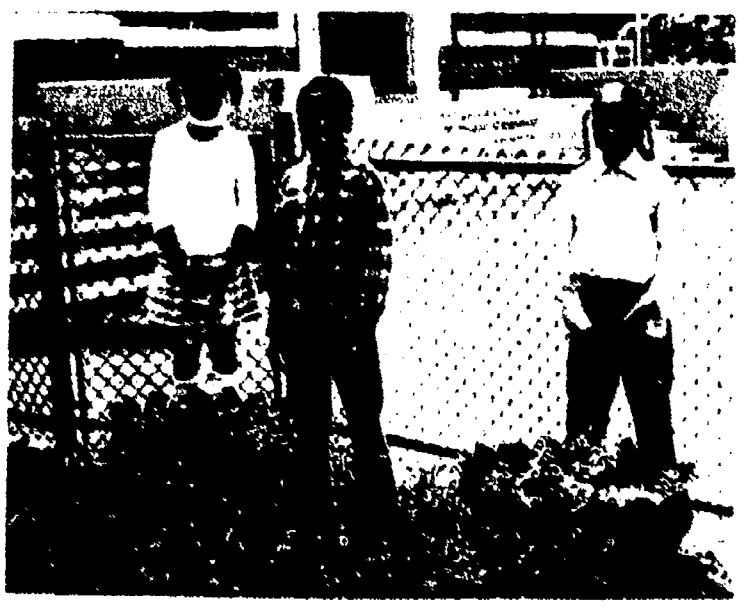
Student fundraising project that turned an environmental problem into a product

additional funds for such projects include taffy-apple sales, movies, candy sales, dances, bake sales, popcorn and doughnut sales.

Less conventional and very effective approaches have been developed by schools which turned the fundraising venture into an environmental lesson in itself. In many such cases the fundraising ventures have become annual affairs, often in association with earth day celebrations, clean-ups, and the like. A well organized plant sale, for example, which includes advance ordering, demonstration of gardening techniques by students, a garden tea and/or a "sponsor-a-plant" program, will do much to help build a more beautiful local environment, as well as add a festive air to the coming of spring.

Recycling projects are another possibility. The market for the recycled material should be thoroughly investigated, however, so you don't end up with a lot of material and no place to recycle it. One school successfully entered into an agreement with the local telephone company and raised several hundred dollars by recycling the community's telephone directories.

A danger in using recycling projects is that most of the energy may be absorbed in the fundraising effort itself. This can be avoided by choosing your projects carefully. Several schools have, for example, successfully recycled old tires found in vacant lots and along the street, by making them into tire planters.



STEP 8: PRESENTATION OF THE MASTER PLAN FOR APPROVAL

After your master plan has been assembled and your potential resources identified, the master plan should be presented to the school staff and parents' organization. When their sanction has been obtained, the plan should be presented to the proper authorities of your school district for final approval. Be positive in your presentations by pointing out various assets of a school site development project, such as those outlined in Chapter I. Your presentation can also be enhanced by involving students and using visual aids (e.g., models, charts, etc.) which have been prepared in planning the development of the site.

When you present your plan to district authorities, don't be afraid to point out any drawbacks which you feel may be contained in the plan, *along with* the rationale or compensating factors which could be implemented to alleviate those drawbacks. This will help to establish your credibility, and demonstrate the extensive thought and deliberation which have gone into your plan.

Several design schemes (variations) of the plan should also be presented, along with your recommendation of the plan which the entire school (through your committee) would like to see implemented. Even if one of the alternatives is obviously deficient, it is much more difficult for a reluctant board to turn down several proposals than it is just one. Don't back yourself into a corner, therefore, by trying to defend only one way of doing things. Also, if no alternatives are presented a minor objection may result in a flat rejection of what, on the whole, may be a very exciting set of plans. So do take the time to develop several alternative design schemes for the initial presentation.

If your plan includes the development of a pond or water habitat, special consideration should be given the inclusion prior to presentation of your master plan for approval. A pond can add a great deal to the instructional program of your school, but one should be prepared to provide answers to the natural concerns which may be raised. Information covering the development and the instructional and practical value of ponds can be found in Appendix A.

STEP 9: IMPLEMENTATION OF THE MASTER PLAN

Implementation of the master plan, or the actual development of the site, is perhaps the most exciting step. In accordance with your master plan, projects should be allocated as those to be contracted out and those to be completed by individuals or community groups.

Projects To Be Contracted Out

Projects that have been contracted out should be carefully supervised. If heavy equipment is to be used, make sure the operators are told precisely what is to be done, to ensure that existing trees and other natural features which are to be retained are not destroyed. Marking trees and habitat areas which are not to be disturbed with red flags or ribbon is highly recommended.

Projects To Be Completed by Individuals or Groups

Projects which are to be carried out by students, school staff, and community members or volunteer groups can be organized to take place in a number of ways, all of which are appropriate.

One method is to complete projects individually over an extended period

of time. In this way funds can be used as they become available. A longer time span will also allow for modifications to be made in the plan as interests change.

Another approach which has proved highly successful in starting the ball rolling is to initiate the actual site development effort with a workday, which is a modern day version of a workbee or a barn raising. This is a day on which teachers, students, parents and other volunteers work together to dig holes, plant trees, spread wood chips, paint asphalt markings, build improvised playground equipment, drink lemonade together and, if it's on a Saturday, see the principal in something other than a coat and tie -- and just in general, see how much can be accomplished together.

A workday doesn't just happen, however. It takes time and organization, because most people no longer have the habit of responding to such a community call. A good publicity person is therefore essential not only to publicize the workday, but also to make media contacts well in advance of the date you want the publicity used. A news release which states the "what, where, when, why and how" of the event should be prepared and mailed to the local media at least one week prior to the desired release date. In publicizing the workday be sure to include a rain date just in case, to assure that all your organizing efforts aren't lost in the event of rain.

4 *Saturday workday*

One way of recruiting parents and fellow teachers is to appoint a subcommittee of students to put together a table display of plans, models and photos, along with various sign-up lists indicating what needs to be done and what can be brought (shovels, refreshments, etc.) to assist in the workday. The display should be located in a well traveled area and manned at an effective time, e.g., on parent visitation day. Persons who sign up might be given an insignia such as the one shown below, which can be pinned onto them. It is a simple reinforcement, but it helps to develop an *esprit de corps* which will get people there.

An effective way to organize the tasks which are to be accomplished on the workday is to hold a community meeting during which the projects to be accomplished are discussed and various persons assume the responsibility for making certain they are completed. Someone should also be asked to take charge of tools and, on the workday, have masking tape and an indelible ink marking pen so that "whose shovel is whose" can be distinguished at the end of the day.

Guidelines for Planting

Just prior to a planting day, it is important that a demonstration or slide presentation illustrating the various steps to follow for successful planting be given to all students who will be involved.

In scheduling your planting days be sure to keep in mind the seasonal, as well as the school calendar. Trees and shrubs should be planted by May 15 in order to allow them time to adjust before the heat of the summer. If, as

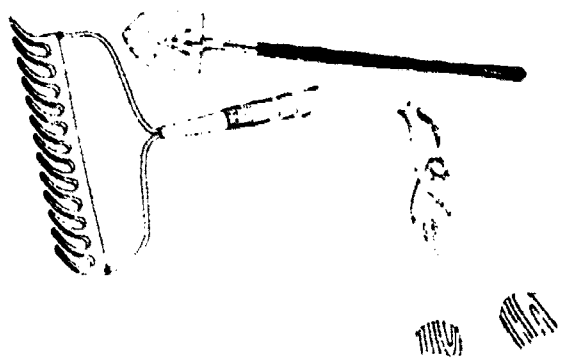
your plans take shape, you see that you will not be getting started until after May 15, it is best to wait until the fall. If plants have already been ordered or donated, they can be stored until the fall in someone's backyard where they'll be sure to get the water and care necessary for survival at that late date.

Another important consideration is water. Newly planted trees and shrubs require a good, thorough soaking to get them started. Thorough initial and successive watering of newly planted stock is essential to successful planting because the root loss and shock of transplanting severely retards the ability of the plants to take up water. If an extensive amount of planting is scheduled and if the planting area is not located near a water source, an idea which might be used that successfully solved the watering problem for one school, is to have the local fire department bring its water truck to the site.

Another standard gardening practice to keep in mind is to dig the planting holes at least one foot in diameter larger than the ball or container of the plant. Throwing a handful of bonemeal into the bottom of the hole is also sound advice. Bonemeal decomposes slowly in the soil and will begih releasing its nutrients in about six months, which is about the same amount of time it takes a transplanted plant to develop a root system and begin to use the nutrients.

As a rule of thumb, a good soil mix is one consisting of 1/3 peat, 1/3 sand and 1/3 native soil. This will help to foster healthy root growth. The soil mix should be tamped around the ball or roots of the plant while watering to assure that it is properly seated in the hole. Be certain to hold the plant while this is being done so that it is seated vertically and is planted at the same depth as before transplanting. (The original soil line on the stem or trunk of the plant should match with the ground level of its new home.) Extra soil should be shoveled to form a circular ridge around the edge of the hole. This will help to hold the water and allow it time to infiltrate. A mulch can also be used around the base of the plant to keep down competition from weeds and to help retain the moisture.

If your planting day will be in the fall, pruning back the stems of trees and shrubs after planting is recommended, especially if bare rooted stock is used. Pruning or thinning may be done without destroying the form of a plant by thinning and removing crossed branches. Pruning back one-third of the crown of the tree is also a standard rule of thumb. Be sure to make all cuts at an angle. Trees heal a cut from the edge and more edge is exposed through an angled cut. (Note: Many trees should not be pruned in early spring when sap flow is at its peak. Thinning is recommended during all seasons of planting.) Don't worry if the plant looks a little shorn after a thorough pruning, for the most important thing to a newly transplanted shrub or tree is root growth. If there is a water shortage before the roots have grown and you have *not* pruned, stems will be left bare and leaves will grow only near the trunk. As an experiment you might prune one tree and leave another tree of the same species unpruned. Results are not instantaneous nor are they assured with such a small sample, but the two trees may become a living reference on tree growth for many years to come.

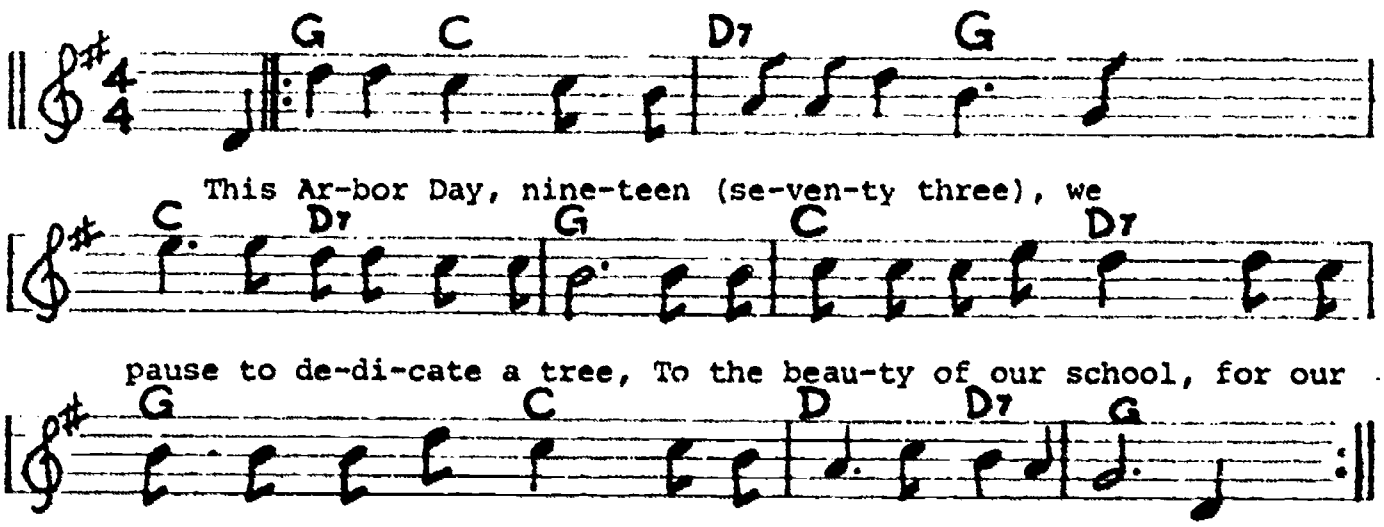


After the major planting is done, don't expect the school site to transform itself overnight. Hours of effort and hundreds of dollars may seem spread very thinly, but it is amazing how fast plants, shrubs and trees will spread out and start to create a new environment. This is in itself an environmental lesson that should be pointed out. It takes time to build a better environment.

AN ARBOR DAY SONG

(To the children of Raymond School)

Music and lyrics by
Donn Paul Werling



So
We

So take up a spade and dig a hole,
And place the tree tenderly
In the waiting arms of dear Mother Earth
Who will raise it to stand tall and free.

We plant this tree at _____ School;
We plant it for the children all.
We plant it for our sons and our children's sons;
We hope it will grow straight and tall.

STEP 10: CONTINUED DEVELOPMENT AND MAINTENANCE OF THE SITE

Development of the site should never come to a halt. It should be an on-going process through which new projects are developed and added as school and community needs and interests dictate.

After the primary site development effort has passed, however, application of the maintenance program must begin. This should have been worked out with your maintenance staff *before* the development of the site.

As stated previously in *Step 6*, the custodial staff will carry out the long term maintenance of the site, but there may be a number of areas which teachers and classes will want to manage themselves as part of their instructional use of the site. It is important that this division of responsibility be clearly assigned, understood and annually reaffirmed. This is necessary to ensure that classroom projects are not "mowed down" and, as old projects are abandoned and new ones take their place, proper management of the entire site is retained. Otherwise, last year's test plot will become this year's eyesore. If a creative play area has been developed, a safety committee should make periodic checks on the equipment (see Appendix E).

Most teachers and students rapidly lose interest in doing "strictly maintenance" work. Success of a project, however, often necessitates that some of the work be done by students and teachers, not just because the custodial staff can't assume the total additional burden, but also because a part of the instructional value of the project will be lost if this is not done. For example, students and teachers are often amazed at how much work and care it does take to keep up a gardening area--and something is learned.

There are ways, however, to organize the work which must be done in such a manner that it doesn't become a burden. Students who finish their class work early enjoy the opportunity for a break from classroom routine and will gladly turn the compost or take food and water out to the rabbit yard. Every teacher has his or her own way of handling the necessary duties that does not disrupt the class or create jealousies.

The use of teacher aids or parent/community volunteers to take small groups outside on a regularly scheduled basis is another method which works, especially for the younger classes. This gives the entire class the opportunity to use the site and to share the responsibility for maintaining it. Student leadership can also be used by selecting class representatives.

Summer maintenance, particularly of gardening projects, requires special consideration. Participation by students of summer school programs is one way of handling it. Another method is to have individual students sign up for one day of work during the summer months. Classroom representatives can take responsibility for one or more weeks during the summer to telephone and remind students when their day is approaching.

Close cooperation with the custodial staff is essential. A routine for the use and storage of equipment must be arranged, as well as provisions made to cover the period of the chief custodian's vacation, during which time a substitute may take his place. If the substitute is not well informed about the project, disaster can result. It has happened. One school lost a beautiful clump of dogwood trees when the substitute engineer, not knowing

what to do with a Neighborhood Youth Corps crew which was looking for something to do, saw the dogwoods growing at one end of the site and directed them to chop those "weeds" down.

Vandalism can be a maintenance problem. If it does occur, it will most likely come when the project is first completed, as novelty seems to attract vandals.

As stated before, the more people that are meaningfully involved in the development of the site, the less likely it is that vandalism will occur. Once a site is initially developed, its continued development and proper maintenance will attract more students and community members after school and on week-ends. Experience has shown that a school site which attracts students and community members will be much less likely to attract vandals.[12] (Students from neighboring schools may be a special problem and effort should be made to keep them informed of the project. One should not, however, expect the entire neighborhood to become saints overnight.)

Another means of curbing vandalism is to keep your student body informed of individual and group projects as they occur. The author is reminded of a small but outspoken first grader at the Raymond School in Chicago who had helped his class make an orange crate birdfeeder. As part of the project he and other members of the class went around to the various classes and explained what they had made and what they were going to do. In an upper class someone snickered from the back of the room, "I'm going to go out and tear that [birdfeeder] down tomorrow!" The first grader, who was no more than half the size of his audience, replied with a shaking fist, "You better not!" The birdfeeder was never touched. This contrasted vividly to a wren birdhouse which a member of Chicago's Neighborhood Youth Corps made and put up on the Raymond site *without* the involvement of the students. It was torn down the next day.

Comparable projects, yes, but comparable process, no. Involvement is the key.

[12] Wells, *loc. cit.*

Chapter Three

Case Studies

There is no better teacher or source of inspiration than experience. It was previously stated that your school site, whether inner city, suburban or rural, can be a model of sound environmental practice. The following three case studies are descriptions of instances in which someone became excited about the possibility that a school site development program offered. As a result, something exciting happened. Each project encountered a number of irritations and setbacks, but in looking back, memories of setbacks dim and only the smiles and enthusiastic faces of teachers, parents and students remain. That is, in fact, what makes it all worthwhile.

The first two case studies cover the development of existing school sites, one an inner city and one a suburban site. The third case study is of a school - park complex to be built in a rural, undeveloped area.

Schools and school sites come in just about every age, size, and form. One way of judging the age of your school is by the size of the site on which it is located. Schools built on sites acquired prior to the advent of the auto are usually very small. What little space on the site there is has usually since been taken over by the auto, because teachers no longer walk to work and hence now need the space for their cars. In many instances where the original school building has been torn down and a new building erected, it has been done without appreciably adding to the total area of the school site. The traditional layout of such a school is a strip of lawn bordering the front of the building, and an asphalt playground and parking lot in the back and on the sides. Confronted with such constrictions, one would think that there is little which can be done with such a site except to lobby for additional land. Following, however, is an account of how, with the help of many people, something was accomplished on such a site by reaching out and doing what many thought impossible.

AN INNER CITY SCHOOL

Raymond Elementary School, 3663 South Wabash Avenue, is located on Chicago's southside in an inner city area. Vacant lots are proliferating as apartment buildings and old tenement houses are burned and/or torn down. The majority of its 1,100 pupils live in the highrise and public housing units which line the Dan Ryan Expressway. The area is not, in short, a model of sound environmental practice. Rather, it's an area in which examples of environmental malpractice--exploitation, waste and indifference to the environment--have been institutionalized by the racism, transportation and land-use patterns, and ills which beset all of our major cities.

Schools with boarded - up windows and glass - filled sites are usually part of the pattern. Environmentally this sort of setting creates an atmosphere within

which cynicism, hopelessness and despair proliferate. These things can be surmounted, however, as illustrated in the school site development project here described.

Elma Douglas, a special education teacher, initiated the project. As was stated earlier, nothing good happens until someone gets excited about it. Mrs. Douglas got excited by the learning her pupils experienced through one week in a natural environment with the Chicago Outdoor Education and Camping Program. With the support of the school's principal, she and her pupils decided to do something to improve the school's environment, which was home for the remaining 39 weeks of the school year.

A proposal for a mini-grant of one thousand dollars was written, the proposal was funded by a Chicago foundation, and the project was on its way. With the help of a resource specialist from the Open Lands Project, a local environmental organization, other resource persons from various community organizations were contacted and brought together for a series of meetings to help develop a plan for the project.

Initially, a number of alternatives to developing the site itself were discussed, such as the use of the roof-top or the erection of high fences so that the area would be protected. These were discounted because it was felt that, not only would developing the area in front of the school be most favorable, but it would also provide for a sort of self-evaluation of the project, i.e., if it stayed put, it was meaningful to the pupils and the community at large.

After the initial planning sessions on the project, the ideas covering what should or should not be a part of the site were listed. Pupils participated in the site analysis phase by identifying existing vegetation. Teachers passed on their suggestions for the site as well. These ideas were then given to a landscape architect who volunteered his time to assist in the development of a master plan. The attendance at committee meetings and the support and assistance of the school administration, principal and custodial staff played a vital role in the development and approval of the plan (as well as in its implementation).

Before (the first day of construction)

After (two years later, the same area)

Plans called for the development of a natural area in the north yard and a gardening area in the south yard, which bordered the front of the school. Both areas combined measure 45' X 220'.

Soliciting community support for the project in a school where there is little or no history of past involvement was only partially successful. A com-

munity trip to the Chicago World Flower and Garden Show was organized by the site development committee and did bring approximately 70 parents to a meeting at which the idea developed for the project was presented. Plant sales, open houses and Saturday field trips were other ways in which school and community support for the project were solicited. The most successful of these was the plant sale which included demonstrations by the children, refreshments and a slide show covering the project. The Saturday field trips did not attract the people or generate the enthusiasm hoped for. This does not, however, discount their importance because a precedent was established in which the door was kept open and community input was not only welcomed, but solicited. The local street gangs, for example, were consulted about the project.

After the plan was approved, resources needed to implement the plan were organized. A quick rundown of those secured will give you an idea of the numerous sources to which such an effort can turn. Railroad ties were donated by a local railroad; soil and trees were provided by the Board of Education. (Trees are provided by the Board to Chicago Public Schools as part of every spring Arbor Day celebration.) The Board of Education also put in the nature trail itself, which was made of asphalt. Barrels for planters and plant material were donated by the Chicago Horticultural Society; a decaying log, boulders and numerous plantings, as well as man and machine power, were supplied by the Morton Arboretum. The barrels were cut in half by the city, in response to an appeal made via a local newspaper's "Action Line." Paint was donated by a local hardware store; the barrels were painted by parents; members of the Teacher Corps and a local junior college's horticultural class helped in designing and constructing the garden area; a local high school shop class built the weather station; another hardware store donated a weather vane; a city park district crew came out and sawed the railroad ties with their chain saws; a garden club worked with the pupils in planting, and helped

This small, once asphalt area became a trail to discovery.

An annual affair at the Raymond School, Chicago

to organize the plant sale. When it was discovered that more soil was needed than was available through the Board of Education, the local alderman had soil delivered which had been removed when artificial turf was installed at White Sox Park.

It is important to note that all of these resources were not assembled at one time. While a number of work days were held in which large components of the plan were developed, for the most part the implementation was an organic process in which things were done piece by piece over a period of several years.

Besides the many one-shot assists, every school site project seems to attract its patron saints -- individuals who become dedicated to the idea and

keep coming through with that extra effort and help when it is needed. Raymond had several and their assistance and selflessness were a real boost to the effort, their only reward being the memory of excited children experiencing firsthand how they *can* improve their environment.

Opportunities for involvement became limitless. For example, a custodian brought in tree seeds; a teacher and a patron heard about an old estate being subdivided and went out and gathered up a trunk-load of plant material before the bulldozer came. (Note: At such times as these it is important to have copies of your master plan and a list of plants needed ready to hand out, or you'll end up with a "hodge podge" if all the donations are planted, or disenchanted supporters if you turn the donations down.)

Through the support of the principal and the area superintendent, the author was appointed to coordinate the further development and use of the site. A teacher aide was assigned to assist teachers with some of the logistical problems in using the site, such as additional supervision of children, use and storage of equipment.

One of the greatest boosts to the project was the school's participation in the Chicago World Flower and Garden Show. By showing others what had been accomplished, an *esprit de corps* for the project grew. This event also helped to maintain interest and enthusiasm for the project long after the main development effort was over. (Note: This is probably one of the most crucial considerations in any site development project. Interest--by which is meant maintenance, new additions and use--in most site development efforts often tends to wane after the first year of heavy activity. Annual affairs such as participation in and/or sponsoring of community plant sales, earth days, flower shows, shopping center expositions and other special events can add considerably to the long term success of any site development project. Each such activity may make you bone weary, but the feeling of accomplishment shared will make any frustration worthwhile.)

The most important thing to be drawn from the Raymond experience is that *it can be done*, even in an area of limited space. Skepticism in our urban communities is a hard thing to escape. Vandalism has become such a scourge of so many schools that many people are extremely doubtful that it's even worth the effort to launch themselves into such a project. Many at Raymond were also unconvinced when the project was first proposed. The comment of a parent walking by on the first big planting day is perhaps typical of that attitude: "Why bother. The kids will just come and tear it up anyway!" The following spring the comment of another parent who passed by while a class was using the site, typified how that attitude had changed after the plants not only stayed in place, but also thrived: "What a beautiful project. It's so good to see children involved in something like this when there is so much shooting and fighting going on around here."

What are the "educational" alternatives?

Another effect which was noted the following year by the chief building engineer was that the window breakage rate was cut in half. In the Chicago Public School system in which the cost of willful glass breakage in 1969 was $1,035,000,[13] one must ask where the

[13] *School Beautification and Protection Handbook* (Chicago, Sep. 1970), p. 15.

greatest return on the educational dollar is to be had. It is a sad comment on our society when the only response to such problems as vandalism is in the negative (boarded up schools, plastic windows, new schools built like fortresses), when by having children and the community enter into the process of education, a "can do" spirit and pride develops that is contagious.

A school site development project at an inner city school is, of course, no panacea. It is, however, a positive way of involving children in the process of building a better environment. Teachers and children who take action and pride in their "home" environment will be less likely to despair that any action is worth taking.

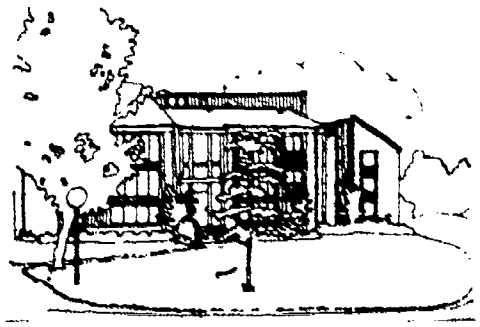
Two quotes, one from a Raymond teacher and another from a Raymond student, help to summarize what a successful school site development effort can do for the self-image and feeling of self-worth, which are so important if people are to work together to bring about change.

A classroom teacher commenting on his experience of manning an exhibit on the school site project at the World Flower and Garden Show stated:

> I have never felt as proud to be a part of something as I was that evening. People from all walks of life came to see, ask questions and talk about what is going on at Raymond. Many people could not believe that this was an inner city school. I feel that Raymond has helped many people change to a positive, constructive attitude about the Chicago schools, in a time when the general image is rather negative. I think that this project is going to have an influence far beyond the Raymond community and that, hopefully, we will see similar projects in other places around our city.
>
> Ross Walker *In and Around Raymond*, March 1970

A fifth grade pupil (newly transferred) wrote:

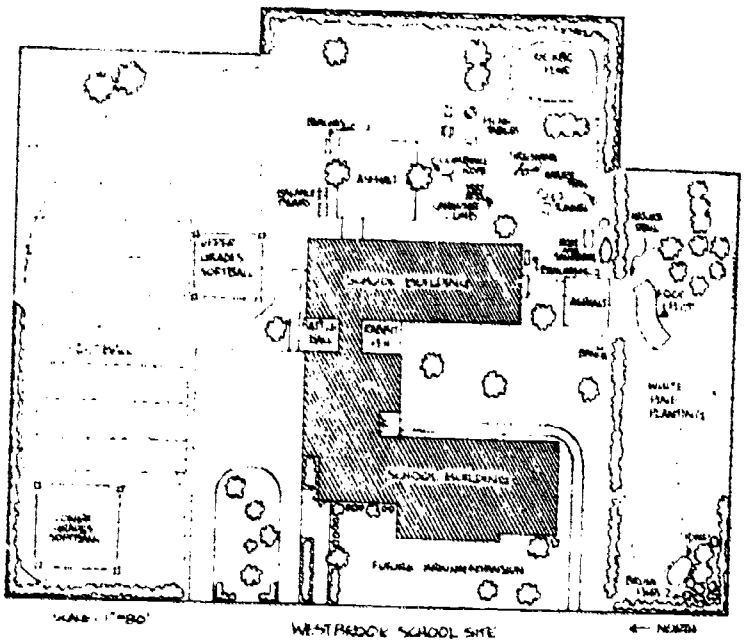
> When I first came to Raymond School it looked so beautiful. I loved the way it looked. My other school was not as pretty. The reason I came to Raymond was because my grandmother said it was a wonderful school. I didn't believe her. When I stepped in I knew she was telling the truth. When I went home I called her and told her she was right. She said, "I know it." We both just laughed.
>
> Sherry Dawson, *Raymond Spotlight*, Fall 1970



A SUBURBAN SCHOOL

The Westbrook Elementary School is located in the Detroit suburb of Farmington. Following is an account written by a sixth grade teacher at the school, Dorothy Cox, who, inspired by a workshop on school site development, got excited and organized her school to develop the entire site.

> During the school year 1970-1971, a school site development plan. . . was created, approved, and work begun. A Site Committee of 16 diverse individuals met to begin a year long study of possible and desirable projects which would provide a diversity of habitat to enrich the curriculum and to provide a more functional site which would improve the microclimate and better serve the neighborhood as a community center for outdoor recreation. The input of opinion was solicited from every student in the school, teachers, principal, art teacher, board of education member, maintenance supervisor, and several parents.
>
> Site blueprints were consulted, scale maps were drawn, a scale styrofoam model was constructed by students, site inventory was begun, a soil conservationist drew up a site plan, and the game biologist from the Department of Natural Resources was consulted.
>
> When the committee's site plan was presented to the Board of Education, it was unanimously approved with a recommendation to purchase more land. The PTO not only endorsed the plan but voted to donate money from the treasury



immediately, and to turn over all proceeds of the annual Pancake Supper for site development funding.

In the spring of 1971, students, teachers, former students, and community members donated time, effort, equipment, and money to carry out site plans. Over 300 trees were planted; the plowing and disking done; the pruning of fruit trees and grapes completed; a compost heap begun; a food plot planted; picnic tables constructed; benches installed; sewer crocks [for climbing and crawling] donated, delivered, and painted; game lines painted on asphalt; a new baseball diamond constructed; a football field established; and nature trails created with wood chips in a two acre nature area.

By the time school began in [the fall], the environment of Westbrook had achieved a new and exciting quality for the students. There were new site features to be explored and tried out, but there were responsibilities to be learned and rules to be developed to retain the quality we felt we had attained.

When finalized site plans were presented to the students, their initial reaction was excitement and elation; then followed a great sadness of expression. "This is great, but whatever we do, the big kids will wreck." The counter argument was to involve as many people of as many ages as possible. What you plant, or paint, or create, you prize--not destroy.

When the first picnic tables were placed outside, students and teachers alike looked several mornings to make sure the tables were still there -- they were.

Out of three hundred pine and shrub seedlings only four or five were found to have been pulled up.

From April to August deliberate vandalism was nonexistant. It was therefore a shock to the whole community when bedding stones from the courtyard boulder display were used to break 87 windows during two consecutive evenings. [Note: This may provide a lesson. Don't tempt fate by using bedding stones.] Several community adults took it upon themselves to keep a frequent and close check on the school site area. For the first time in the last several years, names of suspects were turned in to the administration and by them to the police. Homes were visited and at least one child was to appear in court with his parents. Not one window has been broken since. Instead of four weeks of window waxing and soaping before Halloween, there was minimal soaping only on Halloween weekend. [On the whole] there has been more interest and less apathy.

It's our tree that needs water. It's our school site. It's our community.

The Natural Area

Ordinarily elementary students are restricted to a small playground area where they are under the constant visual supervision of an adult. This area is flat with no diversity of elevation or intimacy of spacial varia-

tion. ...when students were [initially] permitted to visit the rabbit pen in the courtyard and investigate the nature trails, their first reaction was to run, to explore, to hide--reveling in a new found freedom.

The quality of the second nature area is enhanced by the feeling of separation from the rest of the school site. A high hedgerow (10-12 feet) surrounds the acre; the only penetrable opening has been made for the wood chip trail leading in and out. Its attraction apparently is its contrast with the rest of the site -- seclusion, yet proximity. It is not unusual to find small groups sitting on a bench or sitting on top of the rockpile aimlessly tossing stones or looking for fossils. There are fewer fights, and less gang formation at recess since these areas have been made available to students.

The Playground

Flexibility and variety are virtually non-existent on traditional school playground equipment. The addition of four unanchored earthmover tires and two large sewer crocks has given the students something they can use creatively. Swings and slides are a one-way-only activity; crocks are to climb on, in, through, jump on, slide down, and sit on. Tires can be moved, stacked, jumped on, bounced on, or just sat on. Flexibility adds quality.

An asphalt "magic square" was simply a hard dry interruption in the grassy vista until hopscotch, four-square, and running lines were painted on it (designed by the students). Only then did it become an activity centered place.

In the preceding text, the author [Dorothy Cox] has described an adult view of some of the impact of the school site development on the students. But the final judgment rests with the students themselves. In an attempt to obtain such an evaluation, questions were asked of all students in the school in grades one through six. What the students seemed to say in this study points to an environmental quality which includes variety, flexibility, sense of identity, sensitivity, awareness, and creativity.

The key to the whole project has been *involvement* from the beginning planning stages through the implementation. One of the school district maintenance men recently summed up the environmental impact quite well when he said, "It's different at this school now; you can see it, and you can feel it."

A SCHOOL/PARK COMPLEX ON THE URBAN FRINGE

In our previous case studies, interest and enthusiasm for a site development project was sparked by individual teachers who worked with what they had in order to make an existing site a model of sound environmental practice and a vehicle for environmental education. As more people become environmentalized in a school district, the acquisition and development of new school sites can be carried out in such a way that boards of education will:

- select sites for educational potential as well as for ease of construction and/or availability;
- conserve open space and/or unique community features (historical, geological, biological) of the site which would otherwise be lost to development forever; and
- plan for the development of the site in such a way that the ecology of the site is not only respected, but enhanced by the development as well.

School plant construction has leveled off in most districts. On the urban fringe, however, development of new schools and buildings is still a frequent occurrence. Public school districts located in such areas therefore have a unique opportunity and responsibility to both present and future citizens.

Urban sprawl has created conditions in which rural / small town districts on the urban fringe do not need a crystal ball to foresee the rapid growth which is in store for their communities. Residents of such communities may or may not welcome the growth, but it is in the interest of all concerned that action be taken in order to maintain the quality of the environment which attracted the people initially. When steps are *not* taken, the unique natural, historical and educational features of the area are built up long before a park district or other community organization is formed. Public school districts, however, already exist in all areas of the state. By taking the proper steps, they can acquire land in advance (rather than simply settling for land which developers pass up) which is not only much cheaper, but also holds much greater potential for meeting the long-term educational, recreational and open space needs of the community. In this way, school districts can have a positive influence on the development of their communities.

A flat, well drained cornfield may appear to be the cheapest and easiest land to acquire and develop for construction of a school in the short run, but what about the long run--the generations of children, parents and communities who could use public school sites if they were acquired and developed with respect for the natural resources of the area and long term needs of the school and community. If these things are to be taken into account, school districts must plan years in advance.

The following case study shows how one school district recognized the need for planning and acted upon it. The history of school site development in that district is taken from a proposed master site plan for the development of a 135 acre school/park site.[14] In appearance, the site itself was not unusual for the area; but the established goal of the master plan committee to make the site "unusually beautiful as an educational complex without destruction of the present natural environment" is a goal to be emulated.

The Huron Valley School District is located northwest of Detroit, Michigan. Since its formation in 1946, it has changed from a predominantly rural to a suburban fringe district. The large amount of land still available for development points to further rapid population growth.

The school district has developed the working philosophy that "its schools, including the school sites, are resources for the entire community." Through the foresight of the Board of Education and various citizen committees, a 135 acre site was thus purchased with the financial assistance of federal open space funds in 1966, seven years before the building program for an educational park was to begin. In 1972 a school bond issue was passed providing funds for the development of educational facilities on the site. An important provision of the school bond issue was that money could be used for "acquiring and improving additional school sites and improving existing sites."

With the passage of the bond issue, a school site committee was formed. Citizens were asked to participate via articles which appeared in the school district newsletter and community newspapers. Individual citizens who had expressed an interest in the project and others whose work or governmental position would be directly related to or affected by the development of the site, were extended personal invitations. Faculty and students were invited to work on the committee through school bulletins and announcements. Out of a large number of students who responded, eight were invited to participate on the committee.

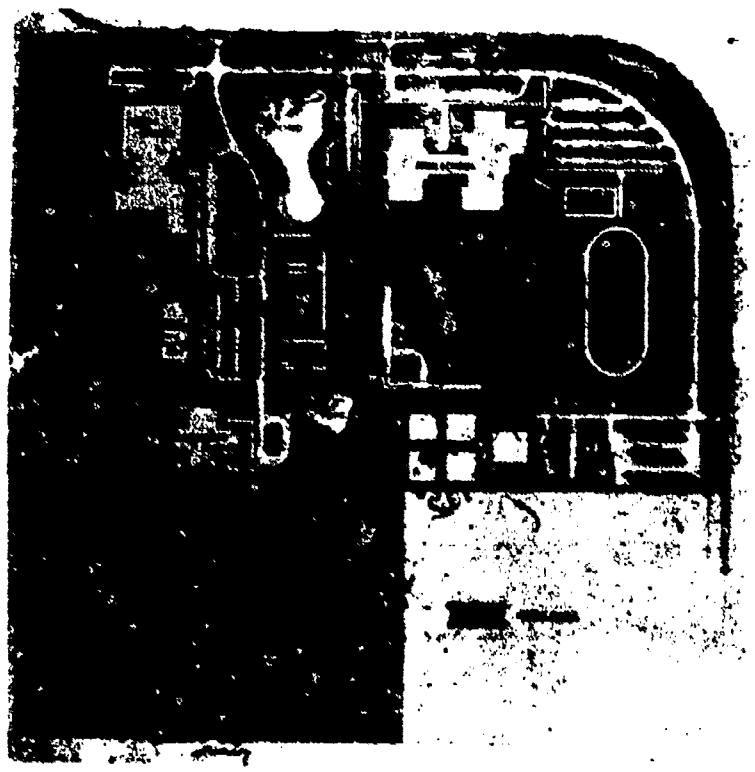
The committee was charged with providing guidelines for the development of the entire 135 acre site, as well as

[14] *A Proposed Master Site Plan for the Bogie Lake Road School Site* (Milford, Mich., Dec. 20, 1972).

reviewing the plans developed by the landscape architect and making recommendations to the Board of Education. Three sub-committees were formed: Ecology and Outdoor Education; Recreation Activities; and Safety and Facility Location.

Twenty-two outside resource people were brought in to act as consultants. The sub-committee made numerous on-site visitations, consulted outside agencies and obtained input from various community groups. Their recommendations were compiled and submitted as a report to the Board of Education. Following, in summary fashion, are the important environmental considerations which the Huron Valley committee recommended be taken into account in developing the site. They provide a good example for school districts undertaking similar efforts.

- Preservation of important site features for environmental study; geological features, existing hedgerows, border areas, woodlot, an orchard, and a high point (overlook) for environmental study
- Preservation of the natural characteristics of the land, i.e., minimize grading
- Design of unobtrusive sidewalks
- Development of a pond
- The hiring of a coordinator to assist teachers in the use of the site
- Consultation with the state water resources commission and Department of Public Health to assure the pollution-free use and discharge of water
- Development of parking lots in a way which is unobtrusive, i.e., break up parking area into smaller lots by using trees and islands of vegetation
- Maintenance of the local school district's awareness of ecological consequences involved in future development around the site (roads, housing, etc.)
- Maintenance of the "natural environment" as the underlying theme in the development of the site.

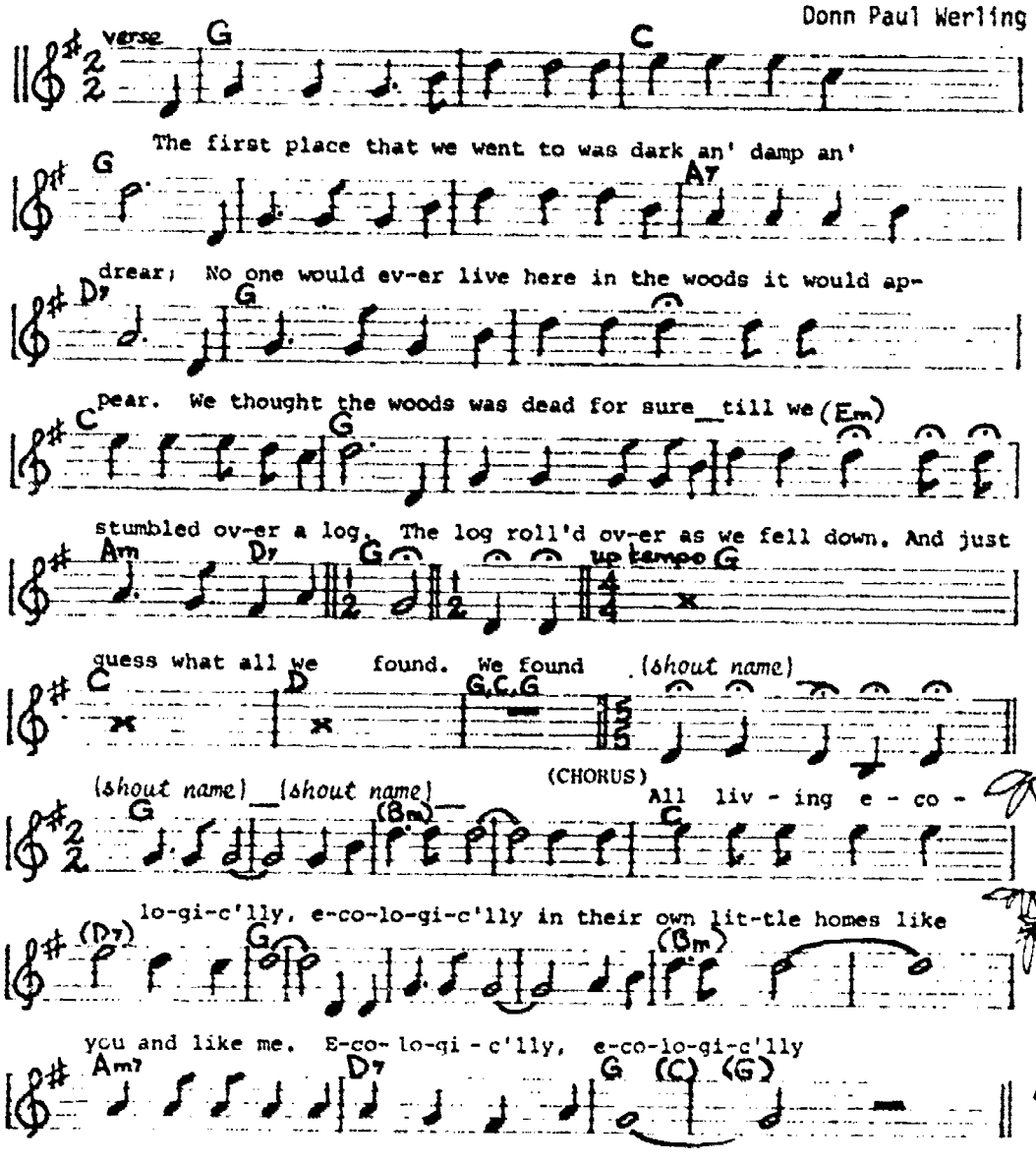


Design scheme selected for the Huron Valley site (Bills, Childs and Associates, Landscape Architects)

ECOLOGICALLY

(To the children of the Lighthouse Nature Center)

Music and lyrics by
Donn Paul Werling



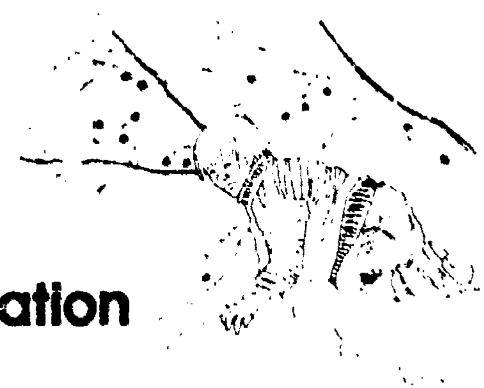
part of the web of life with you, with me.

The second place we went to was down by the pond;
Not a thing was stirring, it looked so dead and calm.
Then something jumped on a lily pad and something else wiggled around,
So we stopped and looked and dipped our nets and just guess what all we found.
We found _____, _____, _____, _____, etc.
All living... (Chorus)

The next place that we went to was sunny and bright and green;
It looked like Mother Nature really had used her Mr. Clean.
We sat down on that green carpet in a completely bug-free place.
And then we dug a little hole down into inner space.
And we found _____, _____, _____, _____, _____, etc.
All living... (Chorus)

By this time I was tired of all this walking around,
But I couldn't help but think of all the life I'd found.
With so much life a livin', we must watch out for each other's toes
Because the world is only so big and there's no place else to go.
(final Chorus)
So let's l ve e-co-lo-gi-c'lly, e-co-lo-gi-c'lly
On the spaceship earth happily.
E-co-lo-gi-c'lly, e-co-lo-gi-c'lly
Partners in the web of life with you, with me.
E-co-lo-gi-c'llyyyyyyyyyyyyyyyyyyyyyyyyy.

BEST COPY AVAILABLE



Chapter Four

Use of the Site for Environmental Education

The process of developing a school site can be an exciting and a motivating experience, but the development is only the beginning of new approaches to teaching, living and learning at your school.

Although the development and use of the site are linked closely together, use of the site will not follow automatically. This chapter suggests a way of introducing teachers to the use of the site, as well as three different, but complementary strategies which will help teachers to make full use of the increased instructional potential of the site for environmental education. Examples of approaches to these strategies are given, but the main focus is not upon lesson plans or novel ideas. The outdoor education movement has produced many excellent publications filled with ideas that can be readily applied to use on school sites (see Selected References, Instructional Use of the Site). The need, now, is to get those ideas off the bookshelf and put to use.

An effective way to encourage use of the site is to involve teachers in the process of developing the program for its instructional use, just as they were involved in the process of developing the site itself. A good way to *begin* this process is to have an hour of in-service time set aside by the principal. The agenda for the first meeting might include:

1. Presentation of slides covering the development of the site

This will help to put all teachers present in a positive frame of mind, including those who were not involved in the site development effort. The smiles and enthusiasm shown in the slides will be contagious. You might call it "teacher readiness."

2. Division into small discussion groups in order to develop a brief statement of philosophy on the use of the site, and guidelines for working with classes outdoors (see sample from Raymond School)

Breaking into small groups will encourage each individual to make a contribution and, hence, an investment.

3. Reassembly and synthesis of ideas.

After the groups have reassembled and have shared and synthesized their ideas, one or two persons should be charged with putting together the final statement of philosophy and guidelines for teacher and student use of the site. After formal approval by the

WELCOME TO RAYMOND'S OUTDOOR CLASSROOM
built by teachers and pupils to make teaching and learning a more exciting and meaningful experience. Here's how:

1. Always have a purpose and discuss it with your pupils before going outside.
2. Wear the *proper clothing* for the occasion. (Remember, on dewy days it's wet in the early morning and in September there are more mosquitoes in the morning.)
3. Establish the ground rules with your pupils. They know what is expected.
   a. What will be the boundaries [illegible]
   b. [illegible]
   c. [illegible] the [illegible] the [illegible].
4. Establish a group [illegible]
   a. [illegible]
   b. [illegible] names for groups facilitates the [illegible] and assigning of activities.
5. Have a signal to bring your class back together again so that everyone can see or hear when someone has something to share.
   a. Hand signal (When your hand goes up, your mouth goes shut.)
   b. Bell, horn, whistles, posture or voice inflection
   c. Upon hearing or seeing the signal, students stand in a circle like the petals of a flower or spokes of a wheel.

TEACH BY EXAMPLE. Pick up any bottles or paper, treat all plants and animals with the respect and admiration that every living thing on this earth has earned.

TEACH BY EXPERIENCE. Use as many of the senses as possible (smell, touch, sight, hearing, taste).

principal, copies of the statement and guidelines should be distributed to all teachers. A supply should also be retained by the principal for distribution to new teachers in the future.

INITIAL USE OF THE SITE

The first experience which a teacher has in using the site with his or her class should be *simple* and *short*. Because students' past experience on the site has often been limited to recess, over-exuberance on their part during the initial use of the site is to be expected. So, while it is important to establish ground rules for behavior, don't worry too much about the do's and don'ts on the first trip.

The first experience should be a casual walk, focusing upon what has been developed on the site. While the teacher should provide primary leadership, an effective technique is to have students take turns leading the class, the condition being that each leader must direct the group to something different on the site. Discussion back in the classroom should focus upon the various things which the class found, why these things are on the site, and possible future explorations.

Nature walks as described above are good introductions, but they are often thought of only as "breaks" from the educative process--nice, but not important or necessary. If the use of your site goes no further, only the surface of its instructional potential will be scratched. Following are three strategies which can help teachers to use the site to its fullest potential for environmental education. While the site can be used to enrich all areas of the curriculum, the primary focus of these strategies is to

- develop a cognitive knowledge of the environment,
- develop a sensitivity toward and an appreciation of the value of the environment, and
- apply this knowledge and sensitivity to the study and solution of local environmental problems.

Knowledge, sensitivity, and action--all three are necessary to environmental education.

DEVELOPING A KNOWLEDGE OF THE ENVIRONMENT

The development of a school site for its educational potential is like the opening of a brand new school full of brand new teaching aids which may be totally foreign to teachers and students. There are simply so many choices that the foreign nature of the "new" school's resources can be overwhelming, thus making it difficult for even the most concerned classroom teacher to know where to begin.

Outdoor education enthusiasts who have experienced the many ways in which the outdoors can be used sometimes add to the confusion by telling others that they can use anything on the site for instruction. What is needed is not a whole pantry full of ideas, however, but simply one idea which can be tried, tested and digested by students and teachers alike. One experience which is planned and comes off successfully can be easily evaluated and serve as a stepping stone to other activities. One way to foster this process is through the use of teaching stations.

Use of Teaching Stations

When your school building was constructed, the educational specifica-

tions which had been developed became classrooms, science laboratories and the like. When your site is developed, educational specifications become teaching stations, i.e., defined areas on your site which can help to teach certain concepts in what is generally considered to be the most effective and exciting way to teach--by experience.

Principles of ecological succession....

A teaching station should operate on the same principle as a gas station. It should make concepts and abstractions come alive by providing the fuel for experience to burn. A class which visits the weather station and keeps a daily record of temperature, wind direction, humidity and air pollution, makes daily weather predictions, records and reports any smoke violations (using smoke charts), will have had an experience in which the relationship between scientific concepts and environmental conditions (the real world) is not just talked about or shown on film; it is "lived." The experience itself is the lesson. Use of a compost, a gardening plot, birdfeeder, food plots, land management zone and other teaching stations, can operate on this principle successfully.

Because of the inter-relatedness of life on this planet, any teaching station on a site can be used to teach a wide variety of concepts. Different teaching stations on your site will, however, be better equipped to teach particular concepts than others (see Appendix A). The strategy for organizing the use of teaching stations is thus a matter of matching up teacher and student interests and curriculum needs with the appropriate stations.

Use of curriculum overview charts may be very helpful in selecting which teaching stations can be used most appropriately at each grade or group level. (Note: Using the charts, a simple outline of the structure and sequence of teacher station usage should be drawn up and distributed to your school staff. This will help to publicize activities and allow teachers to plan in advance for use of the site.) The teachers from each grade level should select the teaching station or stations which they would like to use over the coming year. This process will enable a student to experience, over the years, the total variety of teaching stations which your site contains. By no means is it a process that excludes anyone from using any of the teaching stations when student or teacher interest finds it appropriate. Rather, it is an attempt to help each teacher and each class focus their creative and investigative energies.

Following are two examples of ways in which a teaching station might be selected (see also Appendix A).

EXAMPLES:

If the study of food production in the social studies curriculum occurs at the third grade level, it would be appropriate for this level to manage the food plots of corn, soybeans and the like, in order to develop a better understanding of where food really comes from, how it's produced, and the effect of environmental conditions upon production.

If the study of trees occurs at the 4th grade level, it would be appropriate for the fourth graders to not only study trees, but also to assist in the planting and care of the trees on the site.

By using a teaching station which correlates with the existing curriculum

Fourth graders assume responsibility for the care of existing and new trees on the site.

to be covered, teachers will find that use of the site is not an added burden to the instructional load, but an asset which can help make teaching and learning more exciting and more effective.

DEVELOPING ENVIRONMENTAL SENSITIVITY

The second strategy which can be used to foster effective use of the site is less structured. It complements the first in that, as teachers realize the instructional benefits which can be derived from the one, two, or three formalized uses of the site, a more informal and individualized strategy can be used. Whereas the first approach (use of teaching stations) emphasized the acquisition of cognitive knowledge and understanding of the environment, this section presents two approaches which emphasize the sensitivity component or affective domain, i.e., an appreciation and affection for our environment. Both are essential to the formation of a spaceship earth philosophy.

"Discover and Investigate"

Norman Marsh, a sixth grade science and mathematics teacher in California, designed the following approach for use with his students on the school site. (Mr. Marsh wrote a manual based upon his experiences, *Outdoor Education on Your School Grounds*, and has been instrumental in the development of over thirty-five school sites for educational purposes in northern California.[15]) He called his approach "Discover and Investigate." It consists of writing down on 3" x 5" cards a set of directions for students to follow and questions to which they are to seek answers. The purpose of this approach is to guide and develop the natural curiosity of students by providing a series of open-ended experiences from which students can choose.

As outlined by Mr. Marsh, Discover and Investigate (D&I) cards are "... not a list of questions or things to be done," but are guidelines which enable a student to discover and investigate at his own pace and in his own way. While their content may draw from any subject matter area, the primary purpose is to develop an environmental sensitivity in the student.

A D&I experience is initiated by posting one or more D&I cards prior to a scheduled outdoor class period. Students then select one, copy down the instructions and go out to the site. Ground rules established in more structured outdoor classes still apply, but students are expected to work by themselves. Following are a number of

[15]Norman Marsh, *Outdoor Education on Your School Grounds* (Sacramento, Calif., May 1968). By permission of The Resources Agency of California.

examples of D&I cards used by Mr. Marsh on his school site.

EXAMPLES:

Take a short trail hike. Stop. Sit on a bench. Look around. What seems to be *different* since your last visit by or near here? What seems to be just the same? Has anything been added or removed? Has mother nature been working or sleeping on the job?

1. Take a short walk.
2. Look around slowly and carefully as you walk.
3. Do you see any evidence that small creatures are making it easy for water and sun heat to enter the soil?
4. Explain.

Tour the boardwalk into the bog. Then walk along the meadow's edge. Stay on the trail. Keep walking along the border of the meadow and the forest. Is there any evidence

1. Go down to the brook.
2. Look for fish. Watch them.
3. What direction do the fish usually face?
4. Why?

1. Take a walk Indian style.
2. Look for a bird.
3. Watch its movement.
4. What is it doing? Why?

that...
The meadow is moving into the bog?
The bog is moving into the meadow?
The stream is moving into the bog?
The meadow is moving into the forest?
Can you explain your observations?
Can you predict what changes will look like in a few years?[16]

These are just a sampling of the ideas which can be used. Many others could be developed that draw from other subject areas as well, such as art, mathematics, social studies or language arts. For example:

1. Walk along the trail until you come to the most beautiful object you can find.
2. Examine it closely and from far away. Take time.
3. Imagine that your beautiful object is in a junkyard.
4. Is it still beautiful?
5. What makes something beautiful?
6. Find another object of the same kind. Is it as beautiful as the first?
7. Why or why not?

Teachers can develop their own collection of D&I cards by writing them on 3" x 5" cards with a felt tip pen. An effective way to do this is via a teacher workshop. Cards which are found to be successful should then be

[16] *Ibid.*, pp. 30-32.

exchanged with other teachers. (Note: A number of commercial versions of this approach have also been developed. See Selected References, Instructional Use of the Site.)

As students begin to make discoveries outdoors on their own, they will want to follow up by reading about what they discover as well. It is important, therefore, to develop a good classroom collection of books and references. Encourage your librarian to acquire more books on the environment also.

"Acclimatization"

Acclimatization, developed by Steve VanMatre and outlined in his book *Acclimatization*, is a sensory approach through which an appreciation and awareness of the environment can be developed.[17] As in the previous approach, the role of the teacher is not to be a purveyor of knowledge, but rather a facilitator of experiences which heighten sensory perception and observation skills. The objective of acclimatization is to "immerse" students in the sensory world of the natural environment by using blindfolds and other techniques to focus their attention on the experience. This approach is especially appropriate for lower and middle elementary grades.

This sensory approach should take the place of the collect-and-identify era in which student appreciation of the environment was measured by the number of trees named or insects collected. The name of anything, whether it's a fellow human or a plant or animal, takes on meaning and feeling not because of one's ability to name it, but only through an experience in which the relationship of that object to our own lives is discovered. In a society in which abstractions of reality (e.g., television) make up much of our existence, it is very important that great care be exercised to build and maintain our links to the natural world.[18] Acclimatization is one way in which this can be done.

What do you feel?

Following are two examples of sensory experiences. Sensory experiences can be developed using many other areas on a well developed site as well, e.g., flowers, an herb garden, or by having students take apart and *put back together* a cubic foot of soil.

EXAMPLES:

A SENSORY APPROACH TO THE STUDY OF TREES: middle grades
CONCEPTS: diversity, decomposition, energy flo
EQUIPMENT NEEDED: old ski rope, barn rope or clothes line rope and blindfolds (Students should be instructed to wear slacks.)

One important thing to remember in this exercise is to limit the number of students with whom you're working to no more than 15. The assistance of an aide can be used to remain with the rest of the class, and/or another simultaneous project may be used on which the other half of your class can be working.

Introduce the experience by discussing with the class what it's like to be blind (i.e., cannot see, but other senses are heightened). Using a nearby tree, demonstrate how to "feel" and "smell" a tree--first the leaves (feel, then crumple a leaf for the smell), next the trunk (bear hug it), then the roots going into the ground. Have stu-

[17] Steve VanMatre, *Acclimatization* (Martinsville, Ind., 1972). By permission of the author.

[18] Rene Dubos, *So Human an Animal* (New York, 1968), p. 185.

dents space themselves out along one side of the rope, put on their blindfolds and pick up the rope. They should move forward only when the rope is tugged, and should hold their free hand out and wave it back and forth like a mechanical "sensor." Remind them to concentrate on what their "sensor feels" (heat, cold, rough, smooth, etc.).

Begin in an open, sunny area. Check to see if their sensors are working. "What do you feel?" "It feels warm... the sun!!!" Then pull them under a tree with low hanging branches and slowly pass the tree. Lead them past a variety of sizes and species of trees in this manner. (Note: Be sure that poison ivy is not on your route.) After three or four trees have been "felt" and "smelled" take them to a decaying log, have them sit down, and instruct them to feel, smell, and dig into the various levels of decay.

After this has been done, pull them into an open area away from the log and have them remove their blindfolds. Ask for a volunteer (who is able) to take the group back to the first tree. Continue in this manner to retrace your steps. At each tree have the volunteer leader tell how he or she identified it without having "seen" it before (the size of the trunk, the smell or feel of the leaves). Have other students share their reactions. When you once again arrive at the log, have students debrief about their experience in relation to the diversity of trees; how a tree can act as an air conditioner; and how a tree grows, dies and is part of the web of life.

A SENSORY APPROACH TO THE STUDY OF SOIL: primary grades
CONCEPTS: soil formation and the importance of soil resources
EQUIPMENT NEEDED: old ski rope, barn rope or clothes line rope and blindfolds (Students should be instructed to wear slacks.)

Using the techniques described in the previous example, blindfold students and take them into a wooded area where the natural process of leaves and other vegetation falling to the ground has been left undisturbed, and the action of worms, insects and the like is gradually turning the litter into soil. Introduce this activity by telling the students to role play an earthworm. Have them sit down, pick up a handful of litter, smell it, and rub it between their thumb and fingers. Pass any "finds" (earthworms, rocks) around for everyone to feel. Have them dig as deeply into the soil as they can (They'll run into numerous roots, etc.). Then ask them to refill the hole and repeat the same procedure on a well mowed area. After this has been done, have them remove their blindfolds and debrief about what the difference was in being an "earthworm" in the two different sites.

Go back to the wooded site. Discuss the process of soil formation based upon the students' experience with the leaf litter, rocks, the insects and real earthworms they found, which interact together to form soil. Ask them how long they think it takes the "soil makers" to make an inch of soil (one hundred years). Stop by the compost and discuss how people can help keep the soil rich and productive by using the "soil makers" to recycle what has been taken from the soil.

It sure was easier to take it apart than it is to put it back together....

To many, the use of sensory experiences or "discover and investigate" cards may sound a bit unorthodox; but anyone who has seen the excitement, enthusiasm and learning which one such experience can generate, cannot help but see their value. By confronting students with novel situations, they are forced to question old ways of looking at reality and should begin to formulate new ones. For example, a row of plants is no longer just a "bunch of plants," but different and unique living organisms -- some prickly and some smooth, some attacked by aphids that feel wet and sticky, another that feels soft and fuzzy, and another whose leaves feel like sandpaper -- each of them unique, each of them fellow passengers on our spaceship earth. A pond no longer becomes just water, but a hopping, flying, swimming, diving, eating and changing community of life. Soil no longer is just dirt on which man can walk, but an intricate fabric of roots and worms, spiders and ants which are just as much a part of the web of life as homo sapiens.

DEVELOPING THE ACTION PHASE OF ENVIRONMENTAL EDUCATION

Cognitive knowledge of the environment and environmental sensitivity can be developed by applying the previously outlined approaches to the instructional use of your site. Our schools must, however, not only produce a citizenry which is knowledgeable about the environment and is sensitive to it; it must also produce a citizenry that will take the action needed to help bring about a quality environment for all.

Environmental Encounters

The use of environmental encounters is an approach which has proved effective in moving into the problem-solving action phase of environmental education. Developed by Dr. William B. Stapp of the University of Michigan, the environmental encounter involves the processes of problem solving and valuing, which are an integral part of environmental education.[19] The two processes occur simultaneously, i.e., in working toward the solution of a problem, students will necessarily have to question their values as they make the decisions and take the action decided upon. (Note: The use of values clarification strategies at various critical times in the encounter is important to help students clarify and publicly affirm their values.[20]) While the environmental encounter is like the previous two strategies in that the focus is upon the local environment, it is important to note that encounters address the human dimension, i.e., a person's value system, as well as the physical aspect of environmental problems.

PROBLEM-SOLVING AND VALUING PROCESS[21]

Problem-solving	Valuing
1. Identifying and defining the environmental issue or problem 2. Collecting, organizing, and analyzing data related to the problem	1. Students are presented with an issue.
3. Generating and evaluating alternative solutions	2. Students suggest alternative solutions.
4. Evaluating the alternatives and selecting the best solutions generated	3. Students consider the consequences of each alternative. 4. Students express their feelings about each alternative.
5. Developing a plan of action 6. Implementing the plan of action	5. Students make a free choice.
7. Evaluating the implementation process	6. Students and teachers check the congruence of classmates (i.e., Are one's actions congruent with what one says he or she values?).

[21]Written: B. Stapp, *An Instructional Program Approach to Environmental Education (K-12)--Based on an Action Model* (unpublished paper, Apr. 1971), pp. 9, 17.

There are two sides to every environmental issue: the scientific-technical side and the socio-economic side. An environmental encounter should provide students with the opportunity to experience the *interplay* of these two components. To help teachers and students become familiar with the process of developing environmental encounters (see Appendix B), a series of encounters could be developed through teacher-student workshops. The subjects of these encounters may involve either the

[19]William B. Stapp, "Environmental Encounters," In *Outlines of Environmental Education* (Madison, Wisc., 1971), pp. 104-111.

[20]Sidney B. Simon, Leland W. Howe and Howard Kirschenbaum, *Values Clarification* (New York, 1972).

development or use of the site itself, or community environmental concerns. Those developed can then be filed for future use, but classes should be encouraged to develop their own based upon problems as they arise rather than relying on the predeveloped encounters. For example, the following environmental encounter on the subject of minibikes could have been a spin-off from damage done by minibike riders to an area on the site which students were studying.

Operating Minibikes in the Community
An Environmental Encounter for
the Sixth Grade
(developed by Dorothy Cox)

Behavioral Objectives:

At the completion of a successful encounter, the student should be able to:

1. Describe, in writing, (*number*) problems minibike operation creates in the community.
2. List, in writing, existing regulations for minibike operation at school and in the community.
3. Draw an accurate map of streets in the immediate area showing location of fields, woods, and school.
4. Identify power structure (school officials, governmental policy makers, governmental committees) of his community who influence and make policy on minibike rules and regulations.
5. Describe, in writing, alternate solutions for safe, legal minibike operation.

Activities:

1. Visit home of nearby minibike owner for observation of:
   a. What is size of minibike? In relation to rider? In relation to size of ordinary vehicular traffic?
   b. What is speed and maneuverability of a minibike?
   c. Note noise level of bike when starting and when in operation.
2. Tour nearby streets from ___ to ___; include woods and trails and note following:
   a. What is surface of roads? Is this a hazard to minibike riders?
   b. Is there a visual problem at crossroads? What effect would an unseen car have? What effect an unseen child walking or riding a bike? Would sound level of minibike allow rider to hear either one?
   c. What is effect of bike trails in woods? Note hard pack trails. What animals do you see? What birds do you see or hear? Do you think noise and trails affect them in any way?
3. Draw a map of area locating fields and woods.
4. Survey residents of area obtaining their opinions on:
   a. Any objection to minibikes?
   b. Where do they think owners could or should ride?
   c. What hazards do they see for riders? for the community?
5. Seek information by visit (either at school by officer, or by class at police department) from police on rules and regulations regarding minibikes:
   a. What does the ordinance say?
   b. Are regulations enforced? What are penalties?
   c. Are there any existing or proposed areas for riding?
6. Interview school principal to determine school policy on minibike riders. If principal does not determine policy, who does?

Environmental education starts in the school, moves to the school site and then out into the community.

7. Visit township offices to interview personnel to determine:
   a. Who makes rules for minibikes?
   b. Is there an area available for minibike riding?
   c. Is there an area proposed?
8. What can the class do to help solve problems?
   a. What are possible alternate solutions?
   b. Who can be contacted to facilitate solutions?

Environmental encounters for younger children need not be strongly problem-oriented. Emphasis at this level should be placed upon encounters which foster knowledge and appreciation of the environment, in order to develop the readiness and sophistication necessary for more complex problem-solving activities in the upper grades. (A less problem-oriented encounter might be one in which younger students investigate the variety of plants on their school site, and decide to plant an additional species.) Each class, at all levels, should undertake one encounter during the academic year.

Following are examples of problem-solving activities which can draw directly on the experience of developing and using a school site.

EXAMPLES:

Trees/Plantings: One of the perennial favorites of any site development project is the planting of trees, shrubs and flowers. Once the concept of the school as a "green island" has been realized, students can extend the benefits of their experience into the community.

One activity in which students might engage is a camera survey of the community. Each student should take two pictures; one of the scene which he or she liked best and one of the scene he or she liked the least. After the film is developed, have each student write a short paragraph explaining why the particular photos were chosen. Using this information, the class can identify community assets and problem areas. A strategy should then be developed by the class to recognize and show appreciation to those persons in the community who have been responsible for the good features. Problem areas can also be investigated and a strategy developed to overcome or to improve them.

In every community there will be good and bad examples of community aesthetics. There is, of course room for disagreement and controversy as to what is "good" community aesthetics. This exercise thereby provides a values clarification process for students by surfacing what they feel is best for their community. By designing and implementing a strategy to recognize community residents for positive contributions to the quality of the local environment, students also have the opportunity to investigate first-hand a behaviorist approach to solving environmental problems by going through the process of deciding what is good and, therefore, what should be given positive reinforcement in the community. In this process, the question of *who* decides what is good and on what basis, is also explored. The experience gained can then be used to discuss possible behaviorist solutions to other areas of environmental concern.

Applying their "solution" to a barren asphalt area

Creative Play Area: The preservation of recreational open space has become increasingly accepted as established practice by communities. While open space does have intrinsic value (i.e., there is no such thing as unused space), its use by the community is in

part dependent upon the preservation and development of features and facilities which are attractive to community residents. Without such development, use of these community investments may never be fully realized.

As an extension into community problem solving, students on whose school site a creative play area has been successfully developed can conduct a survey of neighborhood parks and "tot lots," in order to determine the extent to which these facilities are being used or not used by residents. A simple interview technique should be developed and used by students to determine the reasons for use and/or nonuse. Because this process involves students in their own community, their families and neighbors should be able to provide a ready source of data. These data should then be compiled and analyzed to surface environmental factors which either add to or detract from the use of the facilities.

After results of the study are tallied, individual students or the class as a whole should work towards a solution of one or more phases of the problem. Depending upon the problems and alternatives identified, the action phase can range from writing letters to city officials, to petitioning for additional police patrols, to providing benches and planting trees for shade for the elderly.

Rock Wall/Boulder Field: A rock wall or boulder field provides an excellent teaching aid for the study of geology and earth science, as well as environmental issues. Using the school atlas and other library materials, have students locate where various mineral resources are extracted from the earth. Given this information, environmental newsletters covering pending national legislation and environmental issues should then be consulted. (This could be a homework assignment of one or more students.) Newsletters may be obtained through students' parents or the nearest environmental organization.[22] Through this process, the study of geology can be taken out of its usual historical context into the here-and-now questions of strip mine regulations, depletion of domestic mineral reserves and the like. These questions can then be explored at the school in terms of what impact an individual can have upon personal consumption patterns, legislation and corporate responsibility, which relate to this issue.

School Gardening: A school garden provides opportunities for environmental education which can go far beyond developing environmental sensitivity, awareness, and gardening skills. In managing a garden, a number of decisions must be made that tie directly into broader environmental issues which the individual, our communities and our nation as a whole must face. Decisions which are made concerning the garden should, therefore, be placed in their broadest possible context.

A decision regarding maintenance of the soil nutrient level through organic or inorganic methods should be made by students after an investigation and discussion of the problems of pollution from fertilizer run-off from lawns, golf courses and farms. Possible alternatives should also be developed. The decision of whether to use pesticides, companion plantings or biological controls such as lady bugs to keep insect damage to a tolerable level, provides another first-hand opportunity for students to investigate an important environmental issue.

Soil erosion, a primary concern in the last environmental movement, is still with us today. How will it be controlled in their gardening practice at school and at home? How can it be controlled on the site in general and in the community as a whole?

These investigations should not only be aimed at airing the issues, but also at finding out what the current practices of local home owners, the school district and municipal agencies (park districts, etc.) are. How, for example, does the school dispose of its cafeteria wastes? What happens to the leaves and

[22] *Directory of Environmental Groups in Illinois*, 1st ed. (Chicago, 1972).

grass clippings at your school, your home and in your community -- are they burned, dumped, or composted? What pesticides are used by the school, by the park district? Does your community have a soil erosion control ordinance?

A school garden can thus be much more than a gardening experience. By going through a decision-making process with students in establishing how the school garden will be managed and by then experiencing the results of their decisions, students will be better equipped to decide for themselves their stands on (1) how land should be managed, (2) how tax dollars should be used in managing public facilities, (3) what sort of regulation of pesticides, fertilizers and erosion are needed so that farmers can grow the food we need in a manner which is healthful for us and the environment, but does not discriminate economically against the farmer.

INSERVICE TRAINING AND ON-SITE ASSISTANCE

Few teachers have the formal training or background to draw upon in using the site. It is important, therefore, that continuing inservice programs covering the use of the site be provided. Possible resource people who might be contacted include personnel from the school system; state and federal, public and private environmental agencies; and community residents who have specifically needed skills.

In planning an inservice program, keep in mind that it is much better to develop one or two ideas thoroughly than to try to provide only a smattering of numerous ideas. Be sure that programs provide teachers with the opportunity to experience activities *on the site.* Teachers teach as they've been taught. By becoming personally involved in the experience of using the site, teachers will be able to better see how they can effectively use the site with their students.

Although a well designed inservice program can provide teachers with the necessary background and confidence needed to use the site, some on-site

Senior citizens and other community residents can help provide volunteer assistance on the site.

assistance may still be required to make the actual use of the site with students more than a "once-in-awhile" occurrence. The assignment of a teacher aide, parent volunteers or older students as environmental education aides (EEA), can help to encourage regular use by providing teachers with the support and flexibility necessary to make full instructional use of the site. Teachers and students should clearly understand the role of the EEA's, however. While they should be given responsibility, the class should not be turned over to them.

In assigning a teacher aide or older students to work with teachers on the site, consideration should be given to their interest in the outdoors. In addition, if they are not familiar with site resources, they should be given general background information covering various areas of the site. In summoning parent or other community volunteers, remember that it is helpful to secure persons who have a specific interest or experience in one or more components of site usage (e.g., gardening, bird feeding or bird identification, geology, air pollution control, etc.).

There are many ways in which an EEA can be of help to the teacher. Not only can an aide help with any necessary equipment or materials, but he or she can provide the additional supervision which teachers may need in working with students outdoors. When necessary, an aide can also remain outdoors with a smaller group while the rest of the

class returns to the classroom.

The assignment of an EEA will also encourage teachers to block out time for outdoor environmental learning. The scheduled appearance of an aide can be very effective in helping to overcome "teacher inertia." At 1:30 in the afternoon on a tiring day, this can mean the difference between planned activities which are carried out, and just good plans.

The assignment of a teacher aide to work with small groups in the outdoor classroom will facilitate greater use of the site.

The school site can play a very important role in environmental education. It can be used to develop a better understanding and appreciation of the environment, as well as the skills needed to solve environmental problems. Furthermore, use of the site is not limited to students on a 9 a.m. to 3 p.m. basis, Monday through Friday. There is nothing more rewarding to a teacher than to see an excited fourth grader pulling his father by the hand and, pointing up to the swallow house his class made, telling him about the mosquito problem and how his class decided to help solve it.

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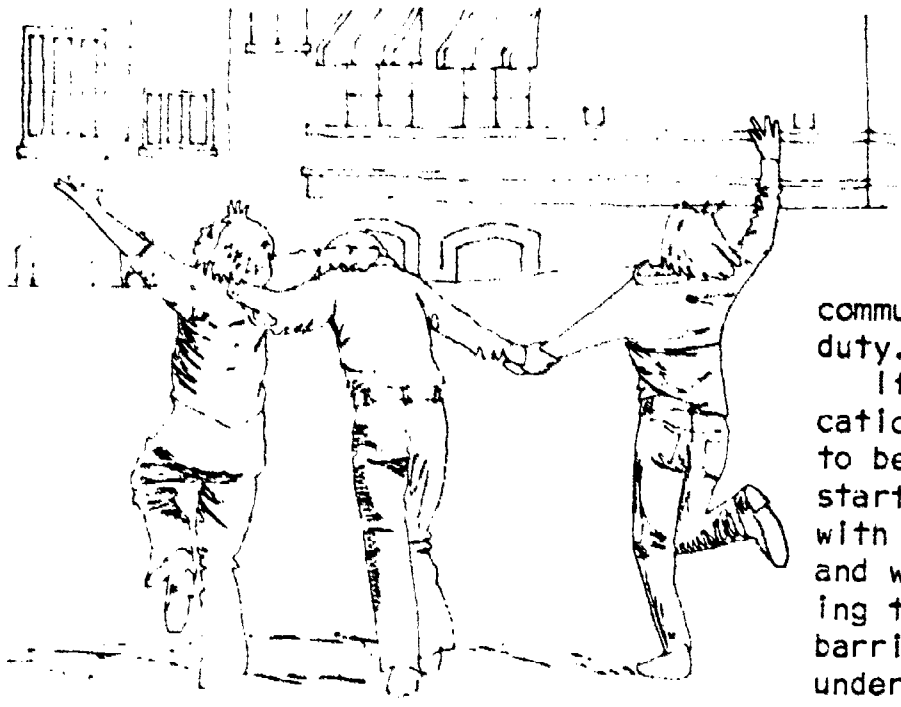
Chapter Five



Spin-offs from the School, to the Home, to the Community

School site development can serve as an excellent vehicle for environmental education. It provides an opportunity for youth to become involved in improving the environment at their doorstep. By starting with the "home" environment, an atmosphere can be created in which the operation of the school plant is brought into congruence with the principles of ecology and the making of a better environment, which every school to some degree espouses. In addition, most schools which have successfully developed their sites have also experienced spin-off benefits from their projects.

There was a time when most teachers lived across the street or in the same neighborhood as the school. Often a child had many of the same teachers as his or her parents. Community leadership and communication lines were well established. In many schools today, however, this has significantly changed. The mobility and heated pace of our society has evolved into a situation in which teachers arrive and depart by auto via the back parking lot, and may never set foot any further into the community than the playground for recess duty.

If environmental education, or education in general for that matter, is to be relevant and effective, it must start where the child *is* by dealing with the environment in which he lives and with which he identifies. By working together to develop the site, the barriers which prevent a teacher from understanding the environment of his or her students can be broken down. The mere act of stepping outside the school and studying the local site is, in itself, an act that can carry a powerful message to students which states: This environment, too, is part of the spaceship earth that is read about and talked about; it too needs to be understood and cared for.

As students feel that their immediate environment is important and feel that something can be done to improve it, their understanding will begin to expand to the problems and concerns of their community. The trees, boulder fields, and creative play areas developed on the site can then serve, not just as specimen examples to be used or studied in themselves, but as links to other areas and problems in the community and country at large. The experience, confidence and expertise fostered by the development and/or use of the site can then be applied to similar or identical issues at home and in the community. Involvement in community problem-solving activities thus becomes a natural transition for teachers and students alike.

Another spin-off benefit which can

be realized through a site development effort (and with the help of motivated individuals) is that, as the success of school site development projects grows, school districts could take affirmative action by establishing district-wide policies covering the acquisition, development and management of new and existing school sites.

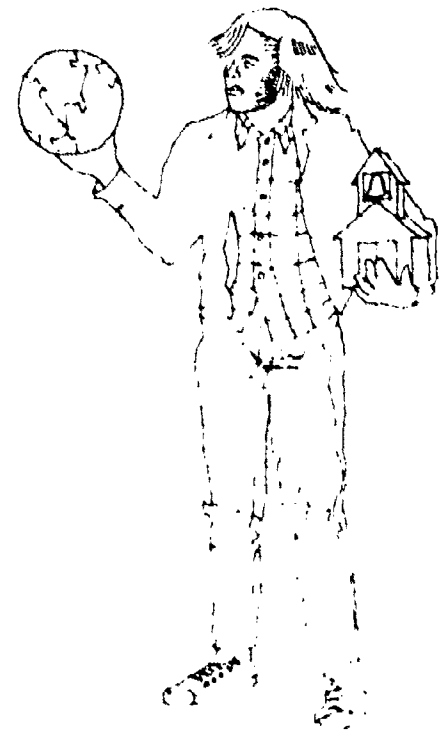
Initial efforts of site development have, in most cases, been inspired by one or two motivated individuals. Not all persons are innovators, however. Some are more faint-hearted than others; others may be just as gung-ho about site development but may not have the support of their administration. Consequently, it is unlikely that the teachers and students of many schools will ever see the development of their school site into an outdoor classroom, unless a school district policy is developed. When the success of your project materializes, therefore, don't rest on your laurels. Your additional effort can have a definite impact on encouraging the development of district-wide policies.

One way in which you can assist is to forward the model policy statement contained in this chapter (p. 57) to a member of your local board of education whom you feel would be open to the idea. Offer the policy statement as something worth his or her and the board's consideration. If you receive a commendation or other board support for your site development project, you might send them a letter thanking them for this support with a copy of the model policy statement enclosed. If you receive letters of commendation from other sources, local newspaper coverage, (written) favorable comments about the project from teachers or parents, or other visible support, copies of these may be included or referred to.

Don't be pushy. Simply act as a respondent to interest shown your project, the intent being that while your school site project may have been your idea, the recommendation for a school district policy on outdoor classrooms can be the board member's idea. By using this strategy, the policy will have a much better chance of being adopted and implemented.

CONCLUSION

Education's initial reflex response to the environmental crisis was to have students listen to speeches, watch movies focusing on clouds of billowing smoke, and make posters which berated pollution. Educational materials developed today reflect a much more sophisticated approach to environmental problems, but even the most emotion-filled film or "dooms-day" text may only serve to increase students' anxieties. Although such materials have a definite place in environmental education, psychologists have stated that if people's anxiety level is raised, but action is delayed, the less likely it is that these people will ever act.[23] What is needed, therefore, is a vehicle which can enable youth and adults to actively participate in solving environmental problems. A school site development project can be such a vehicle for action. It can open the door to problem-solving activities on the school site and in the community that will foster the building of confidence and problem-solving skills which our society so critically needs.



[23] Bruno Bettelheim, *The Informed Heart* (Glencoe, Ill., 1960), p. 263.

(Upon the request of the Governor's Task Force on Environmental Education in the State of Michigan, the following model policy statement was developed after ten months of extensive research by a committee of educators and natural scientists of the Michigan Natural Areas Council. Copies of the complete text of this document are available through the Council's offices at the University of Michigan Botanical Gardens, Ann Arbor, Michigan 48103.)

OUTDOOR CLASSROOM SITE POLICY: A SUGGESTED MODEL

RECOMMENDED POLICY STATEMENT:

It shall be the policy of this governing board of education that:

(1) The sites on which schools are located are fully as important to the educational process as school buildings; each site should have educational specifications developed for it in the same way that educational specifications are developed for school buildings.

(2) The outdoor classroom is recognized as fully important to the educational process as other curricula; each outdoor classroom should have educational specifications developed for it in the same way that educational specifications are developed for other curricula.

(3) This land, the outdoor classroom, shall not be developed in the traditional sense, but rather its existing natural features and natural processes shall be first respected and evaluated by interdisciplinary resource personnel, i.e., biologists, naturalists, landscape architects, soil conservationists, teachers, administrators, urban planners, interested community members.

(4) The administering agency (board of education) shall allocate sufficient monies, public and private, for enhancing the use of this outdoor classroom, always keeping in mind the first priorities of naturalness and respect for natural processes that preceded man's use of this land.

(5) The board of education shall initiate and establish a permanent resource inventory record of each school site consisting of the following site components.
   A. Topography--slope, drainage
   B. Soil--character, type
   C. Vegetation--type, quality
   D. Zoological Significance--birds, animals
   E. Geological Characteristics
   F. Structures--type, quality, historical reference
   G. Natural Vehicular Patterns--ingress, egress
   H. Ecological Significance
   I. Natural Pedestrian Patterns
   J. Orientation
   K. Climatology
   L. Unique Environmental Qualities

M. Curriculum Inferences
N. Water--type, quality
O. Natural Features

(6) After the initial establishment of the outdoor classroom, continued annual review should occur based upon:

A. Records of use of the Outdoor Classroom during the previous year.
B. Presentation of the educational use plan for the ensuing year.

(7) During the design and construction of the outdoor classroom, the builders shall be admonished and required to control pollution of air, water, soils and natural resources of the land as precluded by local, state, and national statutes. This shall be accomplished under the supervision of professional personnel.

(8) It is the intent of this board of education not only to adhere to the following guidelines for an outdoor classroom in the design and development of new school sites, but also to bring present campuses up to those specifications at least to the extent to which the site is adaptable, within a reasonable time, and to continually maintain all sites and outdoor classrooms with the school district in accordance with those guidelines.

(9) To this end, the board of education shall initiate and prepare over the next three years to bring present campuses up to outdoor classroom specifications as related to the following site plans.

A. Resource Inventory Site Plan [site inventory]
B. Site Development Plan [educational, community use, maintenance and landscaping plans]
C. On-Site Technical Assistance Plan [cost estimates made by resource specialists]
D. Follow-up Assistance Plan [breakdown of assistance needed to carry out the plan which has been decided upon]
E. Comprehensive Master Plan [all of the above]

(10) Upon the completion of the Comprehensive Master Plan for the outdoor classroom, the board of education shall provide sufficient monies, public or private, and personnel for the implementation of the plan.

APPENDIX A

Teaching Stations
Tips on Their Construction and Use

Following are a sampling of teaching stations which can be developed on a school site. They relate, either in their construction or use, to environmental education.

BIRDFEEDERS

While the central concern of the environmental movement may have shifted to more pressing issues, there is still plenty of opportunity and reason for classes to carry on some of the more traditional "conservation" activities, such as birdfeeding.

How Constructed: A class can make birdfeeders from old bleach bottles, orange crates, out of scrap lumber, etc.

Where Located: Place away from main activity areas, but in view of as many classrooms as possible.

Who Can Help: This can easily be handled by an individual class.

Maintenance Considerations: Don't start this project unless you are able to carry it through the winter. The birds which are attracted to the feeder(s) will learn to depend on you for food.

Environmental Themes and Understandings: Aesthetic beauty; diversity of life; man's relationship and responsibility to all life

BOULDER FIELD (OR ROCK WALL)

Individual boulders, a boulder field or rock wall containing glacial boulders, rocks used for building materials, and/or ore bearing rocks can be used for the study of geology and a discussion of our non-renewable resources, as well as add a decorative touch to the site.

How Constructed: Use boulders from the site. Other possible sources are: a farmer's rock pile, quarries, local landscaping services, and/or rocks brought back by students from their vacations.

Who Can Help: Contact fellow teachers, community members or an organization who may have a truck for hauling boulders to the site. In constructing a rockwall, a parent who is a mason, a mason's apprentice or landscape contractor may be able to help.

Maintenance Considerations: To do away with trimming around the boulders, make a "seat" for boulders 6 inches wider than the boulder (by laying down a piece of heavy plastic) and cover with several inches of pea gravel or mulch.

Environmental Themes and Understandings: Dependence of life on non-living things (e.g., soil formation, rocks and minerals as building materials); natural beauty of rocks; renewable vs. non-renewable resources; impact of mining

Suggestions for Use: An inservice program on geology, soils derived from various rocks, and the use of rocks for building materials, would be important to assist teachers in the use of this area.

COMPOST

A compost can consist simply of weeds from the garden and pet droppings, which are piled between layers of soil and periodically turned. While this method is not exactly according to

J. I. Rodale, it is simple and it works. Weeds and pet droppings become rich black soil in about six months. Earthworms will multiply by the score and provide more than enough food for pet turtles and frogs. In one school, the cafeteria's vegetable scraps were composted by a class. No matter how simple or complex a composting program is initiated, the lessons present the same opportunities to learn by doing, by providing an alternative to a throw-away pattern of action and thinking.

How Constructed: Compost can simply be a pile of organic material; or retaining walls of stone, wood or chicken wire can be built on three sides, leaving the front open.

While shredding of the compost will speed up the process, it is not necessary. It is important, however, to use more than one ingredient including a source of nitrogen (e.g., manure, grass clippings, soil or blood meal). If cafeteria leftovers are to be composted, don't use meat scraps because a fly and odor problem will result unless expertly managed. The best time to start a compost is in the fall when there is an abundance of plant material. By watering (especially in the first days after starting the compost) and turning the compost at intervals (4 to 6 weeks; the earthworms will do the turning when the ground is frozen), the compost should be ready for use in the spring. It can then be mixed with the soil and/or applied as a mulch.

Where to Locate: It should be near the garden and a water source, but away from main off-site views and main activity areas.

Who Can Help: Garden clubs, parents with a special interest, a local junior college or high school horticultural class, agricultural extension personnel, botanic gardens, arboreta are all possible resources.

Maintenance Considerations: Keep well aerated by turning with a garden fork or spade. Use shrubs or bushes to screen it from public view. Water regularly so that compost is kept moist.

Environmental Themes and Understandings: Demonstrates natural decay cycle, re-use of materials; provides opportunities for students to act ecologically.

"DEAD" LOG

Ecologists have stated that all the principles of ecology can be learned by studying a decaying log and its inhabitants. If your school has a wooded area with fallen trees, you're fortunate. If not, add a log to your site at the same time you plant the new trees. It will give students an immediate opportunity to view the full life cycle of a tree, as well as provide a living demonstration of important ecological relationships.

How Constructed: If you do not have a wooded area and a log is therefore brought in, it should be larger than can be "budged" by two or three children. If you have a wooded area with fallen logs, the area should be identified on the site and a trail located near it.

Where to Locate: Place in an unused portion of the site where it will be left undisturbed, preferably in a shaded area where it is easily accessible from a trail.

Who Can Help: City forestry departments may be able to supply a log, or simply keep your eyes open for a dead tree in the neighborhood or a log in someone's backyard. Contact parents, school maintenance personnel, city departments, local businesses, etc. who may have a truck to help transport the log to your site.

Environmental Themes and Understandings: Foodwebs; decay cycle; interdependence of life; study of renewable vs. non-renewable resources

FOOD PLOTS

Ask a child from the city today where food comes from and he'll probably say "from the store." Growing a small food plot of corn, soybeans, sunflowers, etc. helps to re-establish for students the link between man and his dependency on the soil. Movies on food production or even a visit to a farm are somehow not the same as, for example, planting sunflowers in the spring and then harvesting them yourself in the fall.

How Constructed: Simply plow, spade, rake and/or otherwise cultivate the good earth and plant seeds. Food plots can range in size from a few square feet to an acre or two.

Who Can Help: Parents or local garden clubs can be approached. Technical advice can be gathered from your local botanical gardens, Cocperative Extension agent, high school and junior college horticultural classes.

Maintenance Considerations: Plant early so plants will shade out weeds. Use a crop rotation (i.e., do not plant the same plants in the same place each year) to maintain soil fertility and to prevent weeds from becoming established.

Environmental Themes and Understandings: Dependence of life on plants; the diversity of life; effect of drought, disease and other growth limiting factors; role of birds and wildlife in nature's balance--also, demonstration of agricultural products and advances in agricultural technology (e.g., hybrid vs. nonhybrid seed corn) and for experimental projects (e.g., organic vs. non-organic practice)

GARDENING PROGRAM

The excitement of children seeing their plants grow, caring for them and carrying weeds off to the compost pile is an experience in which concepts such as diversity and difference (which is a weed?), an appreciation of natural beauty, and natural "biogeochemical" cycles are not just talked about, they are lived. Plants may be started indoors from seed, purchased from greenhouses and/or secured as donations from garden clubs or park districts.

How Constructed: Can be planted on existing ground--but if the soil is poor and/or the area is heavily used, plant in raised beds (e.g., made from railroad ties, tire planters, etc.).

Who Can Help: Park district and local greenhouses, garden clubs, high school and college horticultural colleges can be approached.

Where to Locate: Most seed and garden catalogs contain a rundown of which plants require sun, partial sun, etc., which will suggest a location. The area should be well drained, but not subject to drought conditions. Locate so that the natural beauty of the flowers is displayed to the public, but far enough from the main approaches to the school so that vandalism is not invited. Have either your class or the local county agent test the soil for fertility.

Maintenance Considerations: Start small and expand as necessary, so that maintenance doesn't become burdensome. Mulches of various types retain moisture and help to keep down weeds.

Environmental Themes and Understandings: Appreciation of natural beauty and diversity of life; alternative methods of pest control (e.g., companion planting, such as marigolds next to tomatoes)

POND OR WATER AREA

A pond or small pool of water on a school site is not only a rich biological laboratory, but can add a beautiful setting in and around which environmental education can occur. If you conduct a survey in your school, chances are that having a water area on the site will evoke the most interest. Any size site can have a water area. It can range in size from a pond to a small courtyard pool.

A pond on a school site is justifiable both from an educational and practical point of view. It can play a vital part in the total water management plan of the site. Run-off water can be safely stored in a pond thus preventing flooding. The water can be used for irrigation, which will save money on the water bill. Irrigated water can, through proper engineering, be recycled back to the pond through the drainage system. Instead of the red tape and expense of ordering biological material, biology classes can use the pond as a free source of fresh material.

The mosquito problem can be controlled by stocking with fish (e.g., bluegill for ponds; gambusia or goldfish for small pools). With large ponds, safety becomes a real consideration. By having gently sloping sides and by installing an overflow device which does not permit the water level to rise over three or four feet, a pond can be an attractive and safe addition to the site. It can also be used for instructing students in water safety and in the dangers of a gravel pit or strip mine pond, which are not designed for safety.

How Constructed: Your local Soil Conservation agent has specifications for building ponds; an excellent publication, *Small Lakes and Ponds, Their Construction and Care*, will also provide the necessary guidelines. If the size of the site does not permit the inclusion of a pond, a

small water area can be made by digging a hole and laying down heavy plastic covered with sand or soil, out of concrete, or from a sunken bathtub landscaped with rocks and plants. To allow for natural aeration and to avoid stagnation, be sure to "seed" the pond with buckets of pond water as well as plant material from a natural pond, or "plant" water hyacinths or water lilies.

Where to Locate: The appropriate location of a pond is usually dictated by the topography and drainage patterns of the site. A small, "artificial" water area should be located where it will enhance the landscaping scheme (e.g., in a courtyard).

Who Can Help: Technical assistance and information is available through both the Soil Conservation Service and the State Department of Conservation. Local contractors have donated machines and men to help in the construction of water areas at a number of school sites.

Maintenance Considerations: Check local safety regulations. If you are within the city limits, an overflow device to keep the pond fairly shallow and/or a fence may be required, though most statutes require fencing only for vertical sided pools. Avoid locations which have an abundance of throwable objects.

Environmental Themes and Understandings: Foodwebs; appreciation of natural beauty; water pollution testing and study; the diversity of life

Suggestions for Use: Have a naturalist (high school biology teacher, fisheries biologist, local conservation group) present an inservice program covering the simple methods of sampling, testing and using the pond. A pond may look like just water on the surface, but beneath the surface is a whole community of living things which can't be appreciated until someone opens the door.

SUCCESSION PLOT OR LAND MANAGEMENT PLOT

A succession plot or land management plot can be used to demonstrate the effect of disturbance on the environment, and the principles of ecological succession.

How Constructed: If space is minimal, simply plow or spade an area(s) each year in early spring and then let nature take its course. If the space is available, a number of plots can be left undisturbed for a varying number of years (e.g., one can be turned over once every year, one every two years, and one not at all).

Where Located: Locate away from main activity areas; it should not be in full public view.

Who Can Help: If a small area is used, no outside help is needed. For larger areas, usually in suburban or rural communities, a local parent or someone from the community can be contacted to assist in the annual plowing.

Maintenance Considerations: Be sure the custodian and groundskeeper is kept aware of this project so that it is left undisturbed. A fence or sign designating boundaries and a statement of the purpose of the plot could prevent such accidents.

Environmental Themes and Understandings: Principles of ecological succession; the ability of the environment to recover from certain kinds of human modification

Suggestions for Use: For elementary pupils, a simple succession plot in which pupils spade up a small area in the spring, do nothing to it (as contrasted to a garden area, etc.), and then come back in the fall to find the area overgrown, provides a lesson in which pupils will ask how and why. Upper classes could begin a cumulative record involving plant identification and micro climatic studies, which would trace the changes in each plot over a period of years.

WEATHER STATION

How Constructed: Commercial housing for the station can be purchased ready-made, but it is much less expensive to build one of wood. Monitoring instruments can be purchased, or constructed as a class project.

Where Located: The station should be situated 50 feet from buildings, away from dense vegetation, and in full public view to discourage vandalism.

Who Can Help: Wood shop classes at local educational institutions are often willing to take on construction of the housing as a class project.

Maintenance Considerations: It can be fenced in to protect instruments, although this is usually unnecessary. Instruments can be removed when not in use.

Environmental Themes and Understanding: The dependence of all life on the air around us; the atmosphere and associated problems of air pollution; the water cycle--its role in cleansing the air

Suggestions for Use: Operation of the weather station should be carried out by small groups. In addition to its "routine" operation (temperature, wind direction, forecasting, precipitation and their interrelationships), have students conduct a study of air pollution in order to observe the interrelationships such as temperature inversions. Have them post their observations, predictions and conclusions (e.g., whenever the wind is from the west the pollution is much heavier. Why? What's the source?).

A POTPOURRI OF IDEAS FOR SCHOOL SITES

amphitheater for outdoor classes in drama, etc.
outdoor sculpture
benches in quiet areas for creative writing, reflection and art classes
herb garden
small greenhouse
small tree nursery
outdoor cooking area
trails made from log cross sections, woodchips or cut stone
bench marks for mapping and elevation
geometric shapes painted on paved areas
sun dial
plant groups (e.g., desert, prairie)
animal habitats
large outdoor relief maps of the state and/or area painted on paved areas
wildlife area
rabbit pen
dwarf fruit tree orchard
raspberries, wild strawberries
compass rose (e.g., directional compass made of growing flowers, painted on paved area, etc.)
wildflowers
soil profile
woodlot
camera poles (to note the changing seasons)
tree stumps
beehive
windbreak
miniature mountain range and watershed

APPENDIX B

The Encounter Format

as outlined by Dorothy Cox,
elementary teacher at the Westbrook Elementary School, Farmington, Michigan

The encounter format begins with a listing of desired outcomes (*behavioral objectives*) expressed with concrete verbs such as List..., Write..., Describe..., Draw..., providing direction for the learning process and placing greater focus on what the learner does. These objectives should be listed in the same order as the problem-solving procedure activities. For example, the first objective(s) should concern definition of the problem and the next objectives should concern relevant data, etc. These provide a built-in evaluation, making it possible to formally or informally pre-test and post-test if desired.

The second section of the encounter lists the *activities* to be developed with students including leading questions which will help develop the information and critical thinking direction desired. These activities also follow the order of the six process steps listed below.

A desirable third section might include a human and nonhuman resource list of community people and sites, audiovisual material available for the specific topic, field trip possibilities, etc.

DEVELOPING THE ENCOUNTER

The First Step: Defining the Problem. Students should play a major role in selecting and designing environmental encounters. The teacher's role should be one of resource and facilitator. Problems or issues would then be relevant to the local community and make possible the personal involvement of students. Encounter topics could make subject matter relevant by extending concepts to primarily local, but also (in later years) to regional, state, national, and global concerns.

To be effective, environmental encounter topics should focus on root causes as well as symptoms. Picking up litter would be treating the symptom. Developing the concern to change behavioral patterns that caused the dropping of litter would get at root causes. In satisfying consumer demands, technology produces visible pollution (symptoms). Reducing consumer demands not only reduces pollution but reaches and affects root causes. Since each person is a consumer, each encounter should emphasize the demands of *you*, the consumer, as a major ingredient of issues.

Topic examples cover the range of ecological, social, and political interactions. Any and all curricular disciplines can adapt content to many if not all of these areas:

Land resources	Environmental planning	Noise pollution
Water resources	Transportation	Housing
Air resources	Solid waste disposal	Pesticides
Plant resources	Recreation	Power plants
Animal resources	Recycling	Government
Environmental design	Population	Family

The Second Step: Gathering Data About the Problem. Informed decisions can be made only after gathering as much pertinent data as possible. These data should include ecological, economic, political, technological, and social information.

Ecological data include effects of people activities on the natural environment that is affected by the issue being explored.

Economic data may include cost information; benefits, detriments, social costs and capital outlay--historical, present, and future.

Political data describe who makes the decisions in the home, school, municipality, state, etc. You must know which decision-making channels are effective to determine alternative solutions.

Technological data should inform student investigators of the possibilities which technological devices and processes provide for alternative solutions.

Social information will describe the effect on people in both a positive and negative way. Will the alternative or does the problem put people out of work? create an unreasonable hardship? improve the quality of life?

The Third and Fourth Steps: Determining Alternative Solutions and Selecting the Best Solution. When the above data have been collected, possible alternative solutions can be generated and discussed. It is important to explore all possible consequences of each alternative. Role playing and gaming would be a valuable tool here. Also, at this point, values clarification strategies will develop a better understanding by each student of his values concerning the issues and what he is willing to publicly affirm. This would be a valuable preparation for the selection of the best solution and for the type of action planning in which the student is willing to take part.

The Fifth and Sixth Steps: Planning and Carrying out an Action Phase. The action phase of an environmental encounter is one of its most important components. A common student complaint is "People always do a lot of talking but no one ever does anything." To feel effective, students need to *do* something. An elementary school child who picks up litter, makes a bird feeder out of a discarded plastic bottle, makes posters to inform or remind, or writes letters to decision-makers about their concerns is *doing* something.

A middle school or secondary school student who gathers pertinent data and communicates it convincingly to the most effective decision-maker can effect changes and can see that *he* can be effective. An older student, by developing an encounter and participating in community action projects, will develop and refine his problem solving skills.

As familiarity with the encounter process grows, the teacher should find that "encounters" will develop without taking the time to write them down. It's much like the student teacher writing out detailed lesson plans to learn the process. The students will provide the content--if given the chance.

APPENDIX C

Guidelines for School Site Planning

taken from *The School Site in Environmental Education*
prepared by Richard H. MacGown, 1971
Title III, ESEA, Yarmouth, Maine

SITE ANALYSIS
INTRODUCTORY INFORMATION

Securing Base Maps

Topographic maps and aerial photographs are helpful in giving an over-all broad picture of the regional and community characteristics. U.S. Geological Survey maps are not generally satisfactory for gathering or locating details on an area the size of a school site due to their relatively small scale. It is possible to obtain large scale aerial photographs which do provide some detail on larger sites of, say, fifty or more acres.

A school site plan showing the site, building shapes and other features is often included with the contractor's original set of prints used during the time the school was constructed. Site information may also be obtained from property maps or tax maps at the community office buildings or city hall.

The time invested in securing good base maps is well spent for they can help to provide valuable information such as site boundaries, topography, building shapes and locations, swales and drainages, natural vegetation, and other important features. This kind of information helps to make the final analysis more accurate and prevents wasting time in the field duplicating the efforts of others.

Regional and Community Influences

The introduction to the analysis should identify and relate the site to the community and regional setting. This information is important for it helps to explain the nature of the site, its physical character and past and present development in terms of the broad regional and community influences which have helped to shape it.

The following information could be included:

Geographic Location--region, state, county, township, etc.
Size--regional, community, and site size in square miles, acres or other appropriate units of measure.
General Information and Statistical Data--to include Natural, Cultural, Historic, Economic, Social, Institutional and Recreational influences which help to define and reveal the character of the site. Examples:
Natural--regional climatic factors, regional historical geology and soils, resource distribution, and types
Historic and Cultural--ancient, pioneer, and contemporary cultural influences
Economic--history of land and resource use and development; industrial/agricultural/commercial development influence, income distribution
Social--population data, age, employment and income
Institutional and Recreational--types, locations, regional/community importance, etc.

ON-SITE CHARACTERISTICS AND INFLUENCES

Topography and Drainage

Land form and surface movement of water upon the land affect a wide variety of planning considerations and decisions. Circulation linkages and routes of travel can be constructed to take

advantage of the shape of the land and thus provide greater comfort and value to the user. Analysis of the site's topography--its ridges and drainage pattern, flat lands, easy grades, and steep slopes--can help in the organization and physical arrangement of the site for development purposes. Consequently, the planner should keep in mind many site characteristics and features which are directly or indirectly related to topography and thus influence various site uses and activities. Among these are: percent of slope, orientation to the sun, wind movement, cold air and frost pockets, temperature, susceptibility to erosion, pedestrian and vehicular circulation and separation, natural entrances and exits, acoustical properties, overall scale of the landscape, vegetation--type, density, and quality--water runoff rate, water quantity and quality, aesthetic views, surface water habitats and system of linkage, aquifers, aquifer-recharge areas, landscape texture, light and shade values and patterns, land use limitations, and other amenities or limitations imposed by topography and drainage.

Ecology of the Site

During site analysis it is important to identify ecological characteristics of the site. Ecology is the science which studies the interrelationships and interactions between organisms and their environment. In the natural environment, living organisms and nonliving components are constantly interacting upon each other. Exchanges of materials which take place between the living and nonliving parts follow complex circular pathways or cycles. It is important for man to recognize that these interactions are extremely vulnerable to outside disturbance and that wherever or whenever these relationships are destroyed or altered the level of quality of the environment may be decreased.

Generally speaking, the most *stable* and *productive* environments are those which have the greatest *diversity of organisms, of habitats,* and *of successional stages.* During school site analysis, it is important in assessing environmental quality to make comparisons between the population of any given species and the total number of species present. "High quality" is indicated *not* by the greatest number of a particular "kind" (of organism, habitat, or successional stage) but by the most "kinds" of:

Plants and Animals--e.g., grasses, shrubs, trees, insects, fish, birds, other wildlife
Habitats--e.g., forest, shrublands, grasslands/fields, dunes, wetlands, etc.
Successional Stages--e.g., primary, secondary, climax stages

In addition, significant or unique ecological factors should be noted during the general site analysis. These might include:

indicator species of site or micro-site quality, local and micro-climatic conditions, unique or superlative specimens of interest, evidences of natural or man-made environmental influences (ecological problem areas), other important or unique factors related to land, air, water, plant, animal and energy interrelationships on the site.

Obviously, field observations such as these are only rough indicators of site quality. For use as an ecology laboratory, a site should receive much more intensive analysis. Such an analysis would normally be pursued in connection with the program of study and, in fact, would consist of a more-or-less continuous inventory.

Vegetation

Analysis of vegetation on the school site should not only be considered in relation to its ecological value but also in terms of its architectural, engineering, climatic control and aesthetic values.

Architectural value of vegetation includes its use in defining exterior space by forming walls, canopies and floors, in screening out objectional views, and in privacy control.

Engineering uses of vegetation include siltation and erosion control, acoustical controls, atmospheric controls and glare and reflection reduction. Vegetation can reduce objectionable noise by absorbing, deflecting, or defracting sound; it can help control atmospheric pollution by screening out atmospheric particulates and by absorbing CO_2. Also, in urban areas especially, vegetation is being utilized effectively as barriers against excessive glare and reflection from high albedo surfaces such as concrete and glass.

Vegetation also helps to modify and control climate. By acting as windbreaks, vegetation can effectively reduce wind velocity by fifty percent for ten to twenty times the height of a planting.[1] It can control the micro-climate by intercepting precipitation, by holding soil moisture, and by providing cooling shade in the summer.

[1]Lynch, Kevin. *Site Planning.*

Natural and introduced vegetation can increase the aesthetic value of the site in many ways including: its variety, color, form, texture, fragrance, contrast, etc.

During a general site analysis, vegetation may be categorized in broad terms such as types or associations. Specific site purposes (such as an environmental education program would impose) eventually demand that a fairly complete vegetation inventory be compiled. An inventory which considers the ecological, economic, architectural, engineering, climate control and aesthetic values of vegetation can help in more effective development and utilization of the site. Developmental considerations might include, for example, leaving areas of a site in natural vegetative cover for ecological and functional reasons or introducing vegetation for any of the above named reasons.

Summary of vegetational analysis:

Ecological Values--(see Ecology of the Site)

Economic Values--agricultural, forest, and other commercial resource uses; land values, functional considerations.

Architectural Values--defines exterior space, floors, walls, canopies, corridors, privacy control, screening, buffering, separation of incompatible activities and functions.

Engineering Values--acoustical control, atmospheric control, albedo control, soil erosion and water siltation control.

Climatic Value--interception of precipitation, windbreaks, frost depth control, soil-moistur retention, shade value, light intensity and quality control.

Aesthetic Values--visual quality, color, form, texture, fragrance, shade value and patterns, spatial proximity, contrast.

Physical Geology, Soils, Hydrology

These areas are directly influenced by the historical geology of the region as described in Regional and Community Influences. One important aspect of school site analysis is, therefore, to gather physical evidence which will help to relate the geological, hydrological, and soil characteristics of the site to this regional influence.

General considerations could include: (examples relate to a glaciated region)

Physical Geology--land form and topographical features such as eskers, kames, moraines, glacial boulders, rocks (stone walls); glacial striations on rock outcroppings; drift, pre-glacial and post-glacial features--fossils, emerged shorelines and beachers' silt and clay sedimentary deposits, rocks and minerals on site; weathering of rocks and minerals including those in man-made structures. and artifacts.

Soils--Soil types, characteristics, uses and limitations. This information is available through the Soil Conservation Service which has made extensive soil analyses and soil mappings.

In addition, rough field identification of soils can include the following six major classes: clean sands and gravels; silty and clayey sands and gravels; inorganic clays, sandy, silty or gravelly clays; inorganic silts and fine clays; organic silts and clays; peat and muck.

Hydrology--

On-site precipitation data: types, frequencies, quantities, duration, etc.

Surface water data: location, size, quality, formation of, age of; lakes, ponds, marshes, swales, estuaries, bays, major and minor drainage systems, run-off influences, erosion and deposition.

Ground water data: porosity, percolation rates, location, quantity, quality, aquifers, aquifer recharge areas, springs, wells, water table, indicators of water table.

The identification of geological, hydrological and soil characteristics have implications for site planning and development. For example, subsurface conditions may affect excavation, structural bearing strength and drainage. The height of the water table is important for supply and vegetation. A high water table, however, can cause difficulties such as in excavation work, flooded basements, insufficient structural bearing strength of the soil, and unstable foundations. High water tables are often indicated by water levels in wells and diggings, seepages and springs, as well as by indicator plants such as willows and poplars.

Landscape Character

In addition to those factors already discussed, site analysis should also address itself to evaluation of the site from a visual or aesthetic viewpoint. Often the most successful site

development is that which results in the least disruption of the character of the site. Analysis of the site's character should consider:

Visual Form--
- Natural Spatial Organization: areas of enclosure and separation and linkage; land form, vegetation, light, shadow, color, texture, detail, continuity, sequence, structures, seasonal variations.
- Scale: large (environmental) scale; small (human) scale.
- Views and Viewpoints: focal points, dominant features, secondary features.
- Materials: natural surficial materials (rock, earth, water, vegetation)

Sound and Noise--intensity, quality, duration, loud areas, quiet areas.
Light--orientation, albedo, intensity, quality, color, duration, shading.
Air and Air Circulation--quality, diversion by plants or structures, turbulence, eddys, general circulation patterns, cooling effects.
Microclimate--influences due to composite factors listed above.

Historic and Cultural Influences

Recognition and documentation of the site's significant historic and cultural influences offers important evidence of man's cultural heritage. Such site information can serve as an indicator of factors and conditions which have been responsible in helping to influence the environment of the region as described under Regional and Community Influences.

Examples, such as old structures or other artifacts, can often be restored to original quality and can provide educational, historical, and recreational value. Furthermore, these help to add uniqueness and diversity to the man-made environment which, all too often, reflects standardization and sameness.

Existing and Proposed Land Uses and Controls

An analysis of land uses (i.e., human activity areas) should be concerned with the extent to which existing or proposed uses are affecting or may have effects on the site. These effects can have considerable influence on ecological and social conditions in the area. It is important, therefore, that they be identified and evaluated in order to determine where such activities may be incompatible with natural conditions and/or where precautionary measures (policies or controls) could be created to minimize environmental problems.

Land use considerations should include:
- Identification of activity or use area and an appropriate physical description of same.
- Location, capacity and user density of surface and subsurface service and utility functions such as roads, parking areas, power and pipe lines, communication lines, recreational facilities, disposal systems, etc.
- Accessibility of activities from within and outside the site.
- Determining the degree to which the activities or uses are compatible with observed natural and social conditions and needs.
- Type and condition of existing structures.
- Obvious and significant patterns of use.

Policy and control considerations should include:
- Zoned areas
- Sub-division regulations
- Safety and building codes
- Rights of way
- Easements
- Other considerations
- Also, the need for any of these based on the site analysis findings.

OFF-SITE CHARACTERISTICS AND INFLUENCES

The final area of consideration in site analysis concerns the examination of off-site characteristics which influence the site or which are or may be influenced by site development. Such considerations could include any of the previously discussed site analysis factors.

SUMMARY

It can be seen that site analysis is concerned with all aspects of the site's surface and sub-surface physical conditions. These include both natural and man-made environmental influences relating to ecological, economic, political, social, technological, and aesthetic points of view. The outline which follows is a condensation of the previous information and provides a site analysis format which could be used by a committee working in the area of school site selection, planning, development and utilization. It could also be used by teachers and students in the environmental education emphasis within the school curriculum. This is especially important because the school site serves as an outdoor laboratory for activities in the environmental education program. It is important to recognize that site analysis, like community inventory, is performed at various levels of complexity and may, in fact, be a continuous process in view of the constant changes which occur within the natural and man-made environment.

GUIDELINES FOR SCHOOL SITE PLANNING
OUTLINE FOR GENERAL SITE ANALYSIS

I. Acquisition of Adequate Base Maps, Aerial Photographs, or other Graphic Aids

II. Introductory Information

- A. Regional and Community Influences
  - 1. Geographic Location
  - 2. Size
  - 3. General Information
    - a. Natural Influences
    - b. Historic and Cultural Influences
    - c. Economic and Social Influences
    - d. Institutional and Recreational Influences

III. On-Site Characteristics and Influences

- A. Topography and Drainage
- B. Ecology of the Site
- C. Vegetation
- D. Physical Geology, Soils, and Hydrology
- E. Landscape Character
- F. Historic and Cultural Influences
- G. Existing Land Uses and Controls

IV. Off-Site Characteristics and Influences (same as III)

RESOURCE INFORMATION FOR SITE ANALYSIS
GENERAL INFORMATION ON SITE PLANNING

1. Lynch, Kevin. *Site Planning*. The M.I.T. Press, Massachusetts Institute of Technology, Cambridge, Mass., 1962.
2. McHarg, Ian L. *Design with Nature*. Published for the American Museum of Natural History. The Natural History Press, Garden City, New York, 1969.

GUIDELINES FOR SCHOOL SITE PLANNING: PHASE II

PROGRAM DEVELOPMENT

Once the need for a particular kind of development or purpose has been recognized and broad objectives have been established, program development can be undertaken. Just as site analysis is concerned with making an in-depth study of the character of the site, program development is concerned with analyzing the nature of the particular purpose or use for that site. Developing a program to fit the site helps to create the greatest degree of compatibility between site and purpose. Compatibility is reflected by functional design which results in the least destructive disturbance to the site.

The end result of program development is the "program," which, when combined with site analysis, helps to answer four basic questions:

1. What components need to be created (or modified) on the site?
2. What components need to be left on the site?
3. What components need to be removed from the site?
4. What unique qualities does the site have to offer to the development of the program and its specific roles?

The answers to these questions are expressed graphically in the third phase of site planning, Design Concept Development, where the site and program are "fitted" together into a compatible working relationship.

The following outline and examples illustrate, in part, the process of program development. Based on the previous model, the program might begin as follows:

Step 1: Statement of purpose and objectives

School sites can and should be planned and developed to provide greater benefits to the school and community. In addition to providing space for the physical plant, school sites should be selected, designed, and utilized in a manner which will:

1. include broader instructional programs relevant to present and future social and environmental problems and needs;
2. encourage greater community use of a community-owned resource;
3. provide more efficient and economic operation and maintenance of the physical plant through better control and management of environmental factors, such as modification of the microclimate through plantings or orienting activities to take best advantage of microclimatic conditions;
4. serve to exemplify and promote a land ethic to all citizens of the community.

Step 2: The roles of the school site in environmental education

The various roles of the school site in the environmental education program can help to achieve the above objectives. These roles include serving as:

1. an ecology laboratory;
2. an environmental management laboratory;
3. a natural history interpretive area;
4. a multipurpose school-community recreation area.

Step 3: Analysis of these roles for program development

Five research areas are suggested to serve as criteria for analyzing each role. The information which results from this analysis should lead to specific site design considerations and implications. These in turn affect what will be created or modified on the site, removed from site, and left on the site.

The following are examples of some of the kinds of information to seek and some general design considerations and implications which could arise from that information.

Analysis criteria	Information sought	Design considerations/implications
1. Regulations and Standards	Zoning ordinances Safety and health Engineering specs. Construction specs.	Location of boundary and lot lines, buildings, activities, circulation routes, route densities, protection of site during construction, linkage of activities, etc.
2. Unique Characteristics	Specific information about the role, e.g., what makes the ecology role different from the natural history interpretive role.	Helps to identify and protect special areas and components on site needed for that role, e.g., diversity of habitats; diversity of plants and animals; diversity of successional stages.
3. Educational Specifications	Identifies educational level of user; states specific role objectives; determines content to be taught; determines the activities which will take place on-off site in that role.	Establishes specific needs and limits of the areas and components to be used for those activities. (Specific site characteristics also help determine the content and activities.)
4. User Characteristics	Physical, psychological, social needs of user.	Suggests considerations such as best location of activities, user safety and protection, circulation densities, best pathway gradients for comfort, need for variety of activities.
5. Site Characteristics	Information derived from site analysis: a. general regional and community influence b. on-site characteristics c. adjacent off-site characteristics.	Shared school-community facilities and land uses; design compatible with region and community; soil suitability and capability; circulation routes and linkages; aesthetic views; points of interest; microclimatic conditions.

Steps 4 and 5: (Self-explanatory--see Model)

GUIDELINES FOR SCHOOL SITE PLANNING: PHASE III

DESIGN CONCEPT DEVELOPMENT

The final phase, Design Concept Development, is the graphic interpretation of how the site and program should be blended into a compatible solution.

Model Illustrating the School Site Program Development Process

Step 1

Statement of purpose recognizing the need for school sites to serve broader objectives.

Step 2

Identify the components of the purpose- i.e. the broad roles of the school site in environmental education:

I. The ecology laboratory role;
II. The environmental management role;
III. The natural history interpretation role;
IV. The multipurpose school-community recreation area role.

Step 3

Analyze each role according to the following criteria: ...

Regulations and Standards | Unique characteristics | Educational specifications | User characteristics | Site characteristics

... in order to find out -

how the role influences the site---

- What needs to be created or modified on the site?
- What needs to be removed from the site?
- What needs to be left on the site?

and

how the role is influenced by the site.

- What unique qualities does the site have to offer in planning activities within a certain role?

e.g.

Step 4

ROLE I | ROLE II | ROLE III | ROLE IV

Make comparisons between the roles to see how they relate;
Can they share some of the same facilities?
e.g. Should they be linked together? How closely? Where?
What is their best spatial relationship to each other?

Step 5

Conclusions: Summarize these findings by describing how the "purpose" (all the roles collectively) affects, and is affected by, the site.

Steps 1 + 2 + 3 + 4 + 5 = THE PROGRAM

APPENDIX D

SCHOOL SITE ANALYSIS
FORM SHEETS

developed by the
Soil Conservation Service, U.S.D.A.

SCHOOL SITE ANALYSIS
Potential Outdoor Classroom Use or Development

Analysis performed by: _____

School name: _____ Address: _____

School district: _____ School type: _____

Total school enrollment: Now: _____; Five years from now: _____

Number of classrooms per grade:

	Now	Five years from now		Now	Five years from now		Now	Five years from now
K-			5-			9-		
1-			6-			10-		
2-			7-			11-		
3-			8-			12-		
4-								

Name of school representative in charge of development:
_____ Position: _____

1. Basic Information

A. Dimensions of total grounds: length _____ ft. x width _____ ft.

B. Acres: _____; acres occupied by building and pavement: _____

C. Boundaries:
North: _____
South: _____
East: _____
West: _____

D. Current use of site (estimate percentages):

1. Buildings, parking, roads, sidewalks	_____
2. Lawns and landscaped areas	_____
3. Play areas--practice fields, blacktop, swings, etc.	_____
4. Specific athletic sites--football, baseball, etc.	_____
5. Undeveloped or unused area with outdoor classroom potential	_____
Total	100%

E. Building composition:
Wood frame _____; stucco _____; brick _____; stone _____.

II. Survey of Existing Outdoor Classroom Materials

A. Shrubs and trees
1. Approx. no. natives _____; approx. no. native species _____
2. Approx. no. foreign or nurseymen's varieties:
individuals _____; varieties or species _____
3. List of native species:

Name	Approx. No.	Approx. age	Name	Approx. No.	Approx. age

4. Shrub areas: (Check)
school lawn _____; fencerows _____; foundation _____; buffers _____;
local groupings _____; undeveloped areas _____; other locations _____.

B. Forbs (e.g., goldenrod) and grasses
1. Approx. no. natives _____; approx. no. native species _____
2. Approx. no. foreign or floriculture varieties:
individuals _____; varieties or species _____
3. List of native species or varieties:

Name	Approx. No.	Name	Approx. No.

4. Forb and grass areas (grasses other than planted lawns):
Forbs: Lawn _____; fencerows _____; foundation _____; buffers __ __;
floral plantings _____; undeveloped areas _____; other _____.
Grasses: fencerows _____; buffers _____; undeveloped areas _____;
other _____.

C. Animals
Homes observed _____ Location _____
_____
Good site for animal tracks _____
Feeding stations _____; Nests _____

D. Water and wetland areas
stream _____; pond _____; ditches _____; downspouts _____;
swamp _____; bog _____; marsh _____; temporary pond (after floods) _____.

E. Geological--earthsciences
1. Eroded areas _____; location _____
2. Elevation difference between highest & lowest points _____ ft.
3. Types of rock in buildings _____
in graveled areas _____
in outwash areas _____
4. Bedrock exposure _____
5. Erratics _____
6. Rocks, rockpile, gravel, etc. _____

Soils: type _____ location _____
type _____ location _____
type _____ location _____
type _____ location _____
others present _____ soil map available _____
soil profile exposure _____

F. Historical
Markers _____; Monuments _____; Cornerstones _____; Old trees __;
Stumps _____; Other _____.

G. Special Facilities
Weather station _____; Nature trail _____; Student gardens _____

III. Potential for Developing This Site Into a Usable Area for Outdoor Environmental Education: Good Potential _____; Some Potential _____;
Good Potential _____; Some Potential _____; Low Potential _____
Possibility for perimeter areas to be developed _____

IV. Accessibility to Outdoor Areas Off School Property
Access to Parks: Adjacent _____; within 15 minute walk _____
Other areas within 15 minute walk from school:
Open fields _____; vacant lots _____; croplands _____; orchards _____;
deserted farms _____; cemeteries _____; old building foundations _____;
gravel pits and other excavations _____.

NOTE: A sketch of the outdoor laboratory site and recommendations of the survey team should also be included in this school site analysis.

APPENDIX E

IMPROVISED PLAY AREAS

by Tim Speyer, Environmental Education Consultant
Dexter, Michigan Public Schools

At one time, play activity was considered a curious, but unimportant factor in the education and development of youth. Today this attitude has changed remarkably as witnessed by hundreds of thousands of playgrounds being built and used across the nation. In these play environments, children expand their awareness of the world around them--in the process developing their intellectual, emotional, and physical capabilities.

This paper deals with developing creative, "improvised" play apparatus as an alternative to the sterile play equipment usually installed in the swing-slide-seesaw area. The word "improvised" is used here to denote that the only resources available (both material and human) will be from in and around the community and/or vicinity of the reader.

To minimize the monetary expense, the reader should be aware of certain points concerning the development of improvised play areas:

1. There should be no contracting out of any sort for...design or construction help. Large scale design is improbable. The scope of the project should be limited to 1/4 acre or less due to the limited heavy equipment and manpower available, and possible budget restrictions.
2. Organization, design, and construction should be done mainly by volunteers within the community--citizens, parents, teachers, and children. Help outside of the community should not be depended upon to carry out the major share of this project.
3. All money for the project should be raised by community or school projects, unless donated from another source.
4. Since, in most cases, there will be no full time supervision and funds are limited, the possibility of a completely unanchored play area will not be considered here.
5. Expensive construction materials and plant materials should be used only when absolutely necessary. Try to get these materials donated.
6. The recreation problem for the community may not be totally, or significantly solved through the project.

The major intent here will be to explain the procedural steps necessary to organize, fund, design, and maintain improvised play areas. By simplifying and outlining the planning, design, and construction process, this article will serve as a guide which [can] be of practical value to the individual who has no design or mechanical background. Although professional designers have frowned upon such privately undertaken projects, what happens when a community cannot afford the services of such an individual, [or if] there isn't enough money available to pay for construction materials? A community must then act in its own self-interest. Time and time again, the author [Tim Speyer] has seen where just a little initiative and motivation on the part of unprofessional volunteers can bring about a creative, improvised play area for children in an environment which beforehand seemed...sterile and devoid of fun. And since this concept requires very little physical space, it can be adapted to any environment--rural, suburban, and/or inner city.

The procedural steps for developing an improvised play area build upon one another with each successive stage of the planning process. These procedural steps are:

1. Gathering community support and involvement: obtaining a working base to undertake the project.
2. Choosing and analyzing a site: selecting a site within the community which is most feasible and/or available for the project, and placing the play area on the selected site for purposes of maximum utilization and efficiency.
3. Community contacts for construction materials, tools, machinery, and labor: where and how to go about finding these resources.

4. Physical design of the play area: understanding and application of the design process as it applies to this project.
5. Preconstruction day meetings: planning and organizing what will be needed for the construction day.
6. Construction day: organizing and constructing the actual play area.
7. Maintenance, safety, and liability: the need for a regular maintenance and inspection schedule so as to prevent unnecessary injuries, accidents, and potential lawsuits.

Let us examine these steps in greater detail.

GATHERING COMMUNITY SUPPORT AND INVOLVEMENT

Initially, some member, or members, within the community must establish that there is a definite need for a new play area. This opinion should be arrived at through the common agreement of community or school administrators, teachers, students, school groups, parents, church groups, community organizations, and/or youth organizations--as many members of the community as possible. If an outside individual is invited in to consult, he should not bring along any previous notions about what the community needs are, but rather get this information from the citizens themselves.

Once [the need for such a project] is established by the community, those individuals most interested in the project's implementation should form into a central organizing committee. This committee's first job is to make the community at large knowledgeable about the need and purpose of the project, and to begin to gather solid community involvement. This can be achieved through additional meetings announced through community, school, or organizational newsletters. If the newsletters don't bring citizens to the meetings, at least the citizens are made aware of the project.

One excellent mechanism for beginning to involve citizens is through fund raising drives. In addition to obtaining the necessary money needed to pay for construction materials, rented tools, hardware, and machinery, the community will be the target of the drive--and is again made aware of the project's purpose and need. Some possible events for funding might include community, school, or organizational plays, concerts, carnivals, athletic events, sponsored bikeathons or walkathons, car washes, and/or bake sales. Any one or two of these events, if well organized, should be able to raise the necessary funds to undertake the project's construction.

By this time, a broad base of the citizenry should be knowledgeable and involved in the project. This supportive base (even if only five to ten people) *must* be achieved before holding the first of two preconstruction day meetings. These meetings, which should naturally involve as many community members as possible, should deal with three main subject areas:

1. Choosing and analyzing a site for the play area.
2. Finding community contacts for construction materials, tools, machinery, and labor.
3. Deciding upon the physical design of the play area.

CHOOSING AND ANALYZING A SITE

Once the site is located, the physical characteristics which comprise (or will comprise) the actual site should be analyzed. These characteristics are briefly discussed here with some possible recommendations:

Topography--One should integrate sliding, swinging, and climbing apparatus into the hillside if possible, use the tops of hills for concentrated use, build away from where water drains during heavy storms, and consider any erosion problems if grass is worn away (or has the potential to be worn away) on the hillsides.

Plant materials--Placement of existing plant materials suggest various possibilities. Large woodlots and tree masses can provide visual and physical barriers. These areas are also ideal for more passive, reflective activity. Hedgerows or plant materials in a line can also be used as visual barriers, as well as defining the physical limits of a play area.

Proposed shade trees should be of sufficient caliber (diameter) to be guy-wired solidly, thus protecting the tree from heavy winds, rains, and snows. This usually means that trees should be planted up to one to two inches in caliber, the cost of which can easily reach $50 per tree or more. For most projects of the improvised type, only small "whips" (thin young trees) could afford to be purchased. And quite obviously, these can be easily damaged and/or vandalized.

Drainage characteristics--Do not usually build apparatus in areas where water drains and/or gathers during and after a rain storm. Build instead on the slopes or on top of a hill. Use low areas and drainage ditches for mud-play oriented activities. Know where the drains are, and where they lead to, especially if the surface treatment is asphalt.

Water elements--For an improvised play area, an outdoor water fountain or hose outlet should be accessible for play activities with mud and sand, as well as for thirsty youngsters.

Soil--Keep in mind that clay soil is hard, and sandy soil is soft. Thus a deeper foundation is necessary in sandy soil. Heavy use of apparatus built on the side of a hill will wear away grass and cause some soil erosion. Foundations of apparatus at the bottom of a hill, pit, or depression will be subject to more heavily saturated soils.

Public utilities--It is good policy to have access to electrical outlets for construction purposes, but electrical extensions can be used if needed. Build clear of electrical power lines and manholes if possible because they are potential hazards.

Special features--These features alone can either make or break a potential area. Such features might include rock outcroppings, a hill, a pit or depression, a particularly large tree, and/or water elements of some type. Use a positive feature to its fullest potential. Try and rework a negative one so that it can become a positive element in the design.

Orientation--Site orientation suggests consideration of many factors. Know the proximity to streets, highways, school buildings, business establishments, and/or private residences of any play area. Put the play area in a safe place which will not be near traffic or distract those who want privacy. Determine which areas are going to be in the sun most often, and which are going to be in the shade most often. Use plant materials, topography, and water features to their best advantage.

Size--Frequently, the question arises as to how one satisfactorily allocates the apparatus for a particular site. The National Playing Fields Association suggests that if the area is fairly large (half an acre or more), allow a large proportion to remain open for children's ball games, bicycles, and free play. Allow half the remaining area for the provision of conventional tubular steel equipment, if one feels that this type of equipment must be included. The remaining area is for the type of play apparatus described in this guide. Because of the nature of improvised projects, large numbers of children can be accommodated in relatively small spaces.

COMMUNITY CONTACTS FOR CONSTRUCTION MATERIALS, TOOLS, MACHINERY, AND LABOR

Many of the decisions made in analyzing the site may depend on the type of construction materials which are given, donated, or bought for the project. Materials used will vary greatly from donated, tubular steel swings to what many consider "junk": old tires, telephone poles, railroad ties, logs, and ropes. These...elements are not highly aesthetic, but then again, aesthetics is no criteria for judging the success of a play area. These materials are easy to obtain, very inexpensive or free for the asking, but most of all, the children enjoy them. These materials can be collected right on the play site in most cases. Possible community contacts include:

Lumber companies--Many times, rejected boards or log poles can be obtained inexpensively. Cedar log poles, usually six to eight inches in diameter and ten feet long, are excellent for construction purposes. These are relatively inexpensive. Plywood boards for painting and platforms have a high cost, but are well worth the investment. Also railroad ties can usually be obtained here.

Telephone and electric companies--These companies are constantly taking down old utility poles and replacing them with new ones. These huge poles make excellent vertical and horizontal supports, and are usually free for the asking. Also, large wooden spools that hold electrical wire are usually available. They can be stacked and nailed and/or bolted together on asphalt with no foundation necessary. This makes spools the ideal building unit for high density urban use. Finally, woodchips may be obtained. When clearing telephone lines of tree branches, the downed cuttings are fed through a chipping machine and hauled away. The telephone or electric company may deliver, dig and place poles, and deliver spools and woodchips

as a community service. Be persistent, but very tactful in dealing with these contacts. Their help can expand your collection of construction materials and save many hours of hard, tedious labor.

Federal Surplus Product stores--These stores sell stock at unbelievably low prices to public agencies and schools. Investigate whether such a store exists in your area, and ask if you qualify to purchase materials there. Check this contact out before buying anything.

Ski resorts--Ski resorts replace frayed, nylon tow line every spring. This rope is usually in good condition, but is below the safety factor for ski tow use for the coming winter season. Usually, it is free for the asking. But if a choice must be made between nylon rope and manila rope, the latter is better suited for play areas. In addition the large wooden spools [on which] this rope is round, like the electrical spools, make excellent building units for balancing and stacking.

Army-Navy surplus stores--These stores sell rope relatively inexpensively compared to most local hardware stores. If rope cannot be obtained from other sources, this is the logical place to go. Other bargains might be found here if you search and ask. Cargo nets are but one example.

Tire companies--Tire companies will usually donate free of charge. Old tractor tires and large truck tires are best because they are heavy and require teamwork to be rolled around and stacked. The larger the tire, the better and stronger it is, in all probability.

Railroad companies--The railroads are constantly replacing old ties. Many times they are simply cast aside where replaced. Others are stacked in railroad yards and are inexpensive or free for the asking in most cases.

Highway departments--State and local departments may be contacted for tires, culverts, possible sand and gravel, and plywood boards. Plywood boards make up most of our large highway signs. Many times these become obsolete because a new direction is needed. The old signs are taken down and stored.

Real estate companies--Discarded construction materials may be found on vacated lots and properties. The telep numbers of these companies are usually located on signs somewhere on the property.

Trucking companies--Soil, gravel, and/or sand might be available from current building projects under contract. Old tires might also be obtained from this source.

Local contractors--Cement culverts, soil, sand, gravel, and other miscellaneous construction materials which are either not going to be used or have been rejected might be available.

Hardware stores--Some miscellaneous hardware must be purchased especially plenty of machine bolts for securing logs and poles together. Chances of hardware stores donating these supplies is extremely remote. There is little one can do to cut expenditures here.

Rental companies--Only use the rental company if there is a tool which cannot be obtained from within the community. Rentals are usually inexpensive, but can mount up in cost to a substantial amount with usage beyond a couple of days.

Labor--Community or school administrators, teachers, students, school groups, parents, church groups, community organizations, and/or youth organizations are all legitimate contacts for help. It is hard to say just how many of these contacts will need to be sought to fulfill the needed objectives of any one particular area.

PHYSICAL DESIGN OF THE PLAY AREA

Because volunteer planning and labor, and locally available construction materials are used in an improvised play area, hard and fast rules for play apparatus design cannot be given. Illustrations of possible ideas are included here to provide a base to work from. The size and overall dimensions of the apparatus can be generally judged by the scale of the children. The most dynamic and exciting pieces of apparatus are usually the highest. The following notes should serve as a rough guide to the construction methods employed in most improvised play areas:

1. The materials must be absolutely sound and the construction as strong as possible. Accident risk should be no more than in the case of equipment on a traditional play area.
2. Bury all logs and poles a minimum of three feet.
3. For higher logs, poles, and timbers, a general rule of thumb is to bury 1/4 to 1/3 of the total length. For example, a log twelve feet long would be buried about four feet down. A log eighteen feet in length would be buried about six feet. (The deeper you go, the better.) Cement reinforcement in these holes can be used if deemed necessary.
4. Poles, logs, railroad ties, and timbers can best be bonded together through the use of 1/2 to 3/4 inch diameter machine bolts with washers and nuts.
5. When replacing the soil around a log in a hole, be sure that the loose soil is compacted solidly to prevent settling and shifting due to heavy use and wet weather.
6. Large wooden spools need no foundation. The base units should be broad enough, though, so that the higher units are stable and safe.
7. In placing the apparatus on the site, the functions and movements of the various games should be taken into account. Although on the same play area, wilder games and apparatus should be kept apart and divided from more passive play. For example, don't place a sandbox next to a set of swinging tires or a climbing tower.
8. Try to tie various pieces of apparatus together by connecting them with ropes, logs, or any other means. This is a concept known as "linked play." The choice of what to do next becomes an experience, since *all* apparatus is somehow linked together. Instead of individual play units, one has a play environment.

PRECONSTRUCTION DAY MEETINGS

We have now dealt with those broad subject areas that should be discussed in the *first* preconstruction day meeting: (1) choosing and analyzing a site, (2) community contacts for construction materials, tools, machinery, and labor, and (3) the physical design of the play area. A possible agenda for the meeting might run something like this:

1. Discuss and analyze the site and decide on the probable location of the play area.
2. Show on an overhead projector, the illustrations of the improvised play apparatus shown in this guide. This will give the group some idea of what is possible to undertake. The group can then develop variations on these ideas to suit their own circumstances.
3. Figure out approximately how much of each construction material will be needed for each desired piece of apparatus.
4. Assign one or two individuals to each type of construction material. It is their responsibility to try and make the community contacts listed earlier, and to get that material to the play area site if possible.
5. Set up a time for the second preconstruction day meeting--approximately one or two weeks later.

The *second* preconstruction day meeting should run something like this:

1. Find out if the amount of construction materials available or received is over or under what was planned for in the first meeting. Due to the low budget, adjustments or additional followup must be made if there is not enough, or too much, of a particular material.
2. Decide what tools and heavy machinery will be necessary to construct that unit of apparatus.
3. Appoint one or two individuals to captain the construction of each specific unit of apparatus. He or she should know just what material, hardware, machinery, and tools will be needed for that unit on construction day.
4. Find out which individuals can bring their own tools or machinery. Those that can't be supplied by the community will need to be rented.
5. Appoint an individual [to take] responsibility for renting the necessary machinery and tools.
6. Appoint an individual to purchase the necessary hardware.
7. Decide on the date for construction day--when all construction materials, hardware, machinery, tools, and citizenry will come together. Saturday is usually the best time, starting early in the morning and finishing late in the afternoon.
8. Make sure that all those at the meeting have the phone numbers of the central organizing committee. In case of an unexpected problem, these individuals should be notified immediately.

Notice that a relatively small, but important job is given to many different individuals. This helps to spread the work load out and involve as many people as possible.

CONSTRUCTION DAY

Before construction day, those individuals most familiar with the plan should stake out the holes that are to be dug. If the telephone or electric company can dig the holes a day or two before construction, this is most ideal. If such help is unavailable, the holes should still be staked out and dug beforehand so that time is not wasted on construction day. A two-man team with a two-man motorized posthole digger can do the job quickly and efficiently in most cases. Other rented tools and equipment should be secured as early on Saturday morning as possible. Cars and drivers should be on hand to run any miscellaneous errands. Construction day is simply a follow through by each man, woman, and child of the task(s) appointed him or her during the preconstruction day meetings. Much like an old-fashioned barn raising, as many members of the community should be involved as possible; everybody helps and everybody participates. A summary list of the construction materials, machinery, tools, and hardware used for improvised play areas include:

1. telephone poles
2. cedar log poles
3. truck and tractor tires
4. wooden planks
5. old, sturdy, dead trees
6. railroad ties
7. wooden spools
8. cement culverts
9. oil drums
10. ropes
11. sand and woodchips
12. truck or van for hauling heavy materials
13. two-man motorized posthole digger
14. one-half inch machine drill
15. shovels
16. one-man posthole digger
17. carpenters saw and hacksaw
18. hammers, wrenches, and screwdrivers
19. ladders
20. one-half inch by sixteen inch or three-quarter inch by sixteen inch auger bits for machine bolt holes
21. one and one-quarter inch by sixteen inch auger bits for rope holes. An alternative to buying long bits which could bend under stress is to buy shorter bits with a strong bit extension.
22. one-half inch or three-quarter inch machine bolts, nuts, and washers. One can buy machine bolts in prethreaded lengths. Another alternative is to rent a bolt threader and cut down longer unthreaded rods on construction day to needed lengths.
23. Six inch nail spikes for securing plywood boards
24. Chain, chain repair links, and eye screws for swivel log beams and other innovations
25. paint, primer, rollers, and brushes.
26. cement for foundations if necessary
27. electrician's tape.

MAINTENANCE, SAFETY, AND LIABILITY

Once construction is completed, a minimum of maintenance is necessary for two important reasons. The first is to keep the play area sound and safe. Perhaps it will take only a few moments each week to check the area over--replace an old rope, tighten a bolt, or further compact the soil foundation of a vertical log pole. It is the ultimate responsibility of the ...principal of a school...to take the proper precautions to prevent injuries to children. By not checking out and correcting play apparatus that has *obviously* deteriorated or weakened, [the school can be held] liable for negligence. Remember that the construction materials must be absolutely sound and the construction itself as strong as possible. Accident risk should be no more than in the case of a traditional play area.

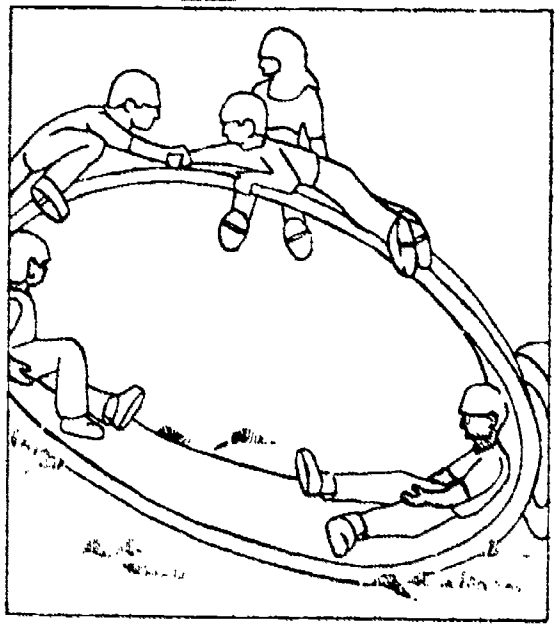
Objects expressly placed for the benefit of children are not considered to be an attractive nuisance. Unanchored elements like tires and log sections, which are not inherently dangerous elements in themselves, are also not considered an attractive nuisance under most conditions. However, let us say a huge tractor tire was left unanchored at the top of a steep hill below which children play. Obviously this situation has the potential to be inherently dangerous--an attractive nuisance situation which shows negligence on the part of some individual or party.

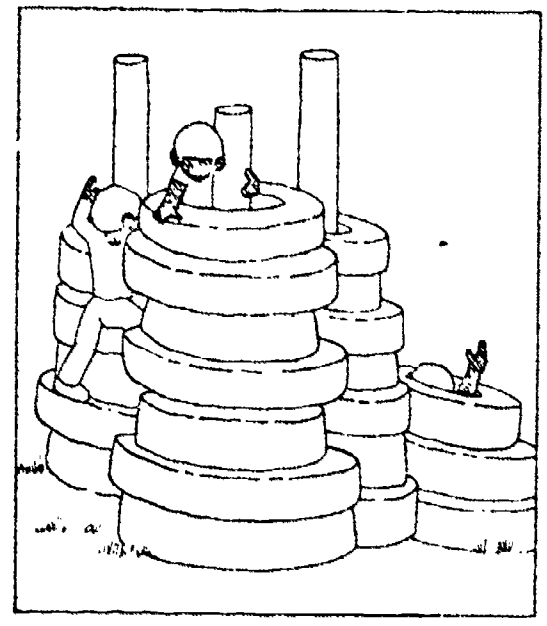
The second reason for a strong maintenance program is to prevent the area from deteriorating so that the children will cease to find it exciting. This means, for example, that if a rope must be taken down, it should be replaced; that if a painting board is covered with profanity, it should be repainted; that if unanchored tires are scattered over the play area, they should be occasionally gathered together. Nothing is more appealing than a viable play area; nothing is worse than a play area that has been allowed to deteriorate. Appoint a committee from your school or community to occasionally check over the play apparatus.

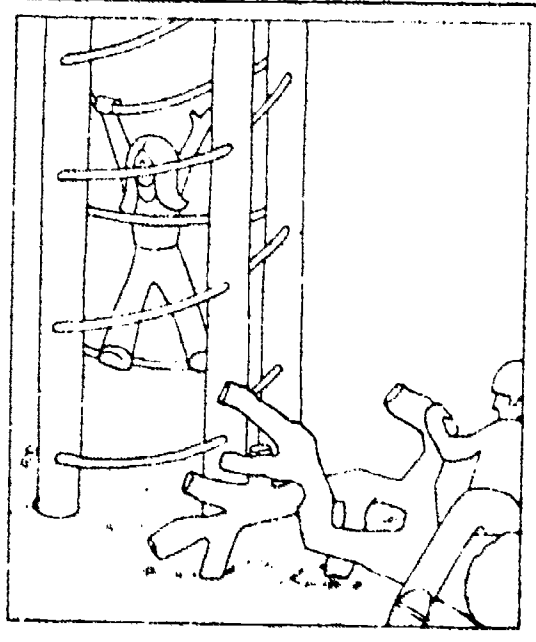
EXPANSION

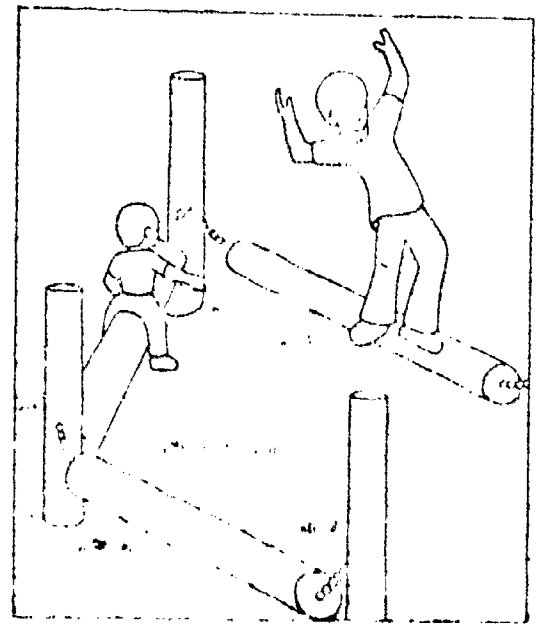
No play area will continue to highly motivate and appeal to children over the years, if it is not improved upon or expanded. Children need novelty and change in their play activities. Keep this in mind after the initial construction of the play area--additional play apparatus is highly desirable. Organization for the expansion of an existing play area should follow the same guidelines as were set down for the original construction day.

This completes the procedural steps needed to plan, design, build, and maintain improvised play areas. Carefully follow through the steps one by one. The result will be a project of which your community or school can be honestly proud.









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INTRODUCING THE IDEA

An Approach to School Site Development. (Motion picture) 16mm 22min sd col (Available for rental from University of Michigan, A-V Center, 416 Fourth Street, Ann Arbor, Michigan 48103; or International Film Bureau, 332 S. Michigan Ave., Chicago, Illinois 60604.)

-For use by elementary or high schools which have large sites or are in the process of selecting a site.

Environmental Education/Facility Resources. New York: Educational Facilities Lab., 1972.

-This report provides a good introduction to the entire range of facilities which can be used for environmental education. One chapter is devoted to the school and school site.

Environmental Enrichment—What You Can Do About It. (Motion picture) 16mm 21min sd col (Available from University of Michigan, A-V Center, 416 Fourth Street, Ann Arbor, Michigan 48103; or Centron Educational Films, 1621 West Ninth St., Lawrence, Kansas 66044.)

-For use by elementary schools. It documents a process approach to site development on an existing site.

U.S. Dept. of Agriculture. Soil Conservation Service. *Outdoor Classrooms on School Sites.* Washington, D.C.: Government Printing Office, 1972. (#0100-1458, 25¢).

-An introduction to ways in which a school site can be developed and used for instructional purposes. Suburban and rural focus, but can be adapted to urban sites.

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Background on Site Planning

McHarg, Ian L. *Design With Nature.* Garden City, N.Y.: Doubleday, 1967.

-Good background reading for school district personnel on the suburban fringe.

Simonds, John Ormsbee. *Landscape Architecture.* New York: McGraw-Hill, 1961.

-A reference on an ecological approach to site planning and development.

The Particulars of Site Development

Allen, James and Alvin C. Lopinot. *Small Lakes and Ponds, Their Construction and Care.* Springfield: Division of Fisheries, 1971. (*Fisheries Bulletin*, No. 3).

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D'Eugenio, Terry. *Building With Tires.* Cambridge, Mass., Advisory Committee of Open Education, 1971.

-Shows how to make swings, climbers, tunnels and other improvised play equipment from tires, along with safety considerations, construction ideas and cost estimates.

Friedberg, Paul M. *Play and Interplay.* New York: Macmillan, 1970.

-Documents the need of children for space for creative, imaginative play and its effects on personality growth.

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-Contains discussion and numerous photographs of creative play ideas, many of which could be easily constructed on a school site.

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-This article is loaded with the information needed to develop a small natural area for a plot of land 100' x 120'. It includes information on the mature height of trees/shrubs, drainage and light requirements, and the wildlife attracted to them. Reprints available through National Wildlife Federation.

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-A publication for laymen, which points out the importance and the pitfalls of knowing the kind of soil on the site, its capabilities and guidelines for development.

Rodale, Robert, ed. *The Basic Book of Organic Gardening.* New York: Ballantine, 1971.
-Good information source for composting and other organic gardening practices.

Robinette, Gary O. *Plants/People/and Environmental Quality.* Washington, D.C.: Government Printing Office, 1972 (2405-0479; $4.00).
-A reference work which documents and illustrates how plants can be used to improve environmental quality, e.g., microclimate, aesthetics, pollution.

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-Thank-U-Grams are thank you notes modeled after a telegram. They provide a way of saying thank you which is not only convenient and sincere, but also helps to foster an appreciation of the efforts of others.

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-A "how to" manual for developing flower gardens. Information as to where to plant; how to start, thin, care for and use flowers.

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-Outlines various ways in which trees are damaged during construction and what steps can be taken to prevent the damage.

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-Contains pictures and descriptions of plants which grow in shade according to various climatic zones, along with planting instructions.

U.S. Dept. of Agriculture. *Soil Conservation at Home.* Washington, D.C.: Government Printing Office, 1969. (*Agriculture Information Bulletin*, No. 244) (#4467-271-686; 20¢).
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-Contains a breakdown of methods for selecting select trees based upon the size and age which they will attain, as well as desirable and undesirable characteristics. It also contains extensive directions on planting and care and a bibliography of other publications which are available on the subject of plants.

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-A "mini-encyclopedia" of gardening practices which gives tips on how to select and start plants, prepare the soil, make and use compost.

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-An inexpensive series of forty investigations developed in collaboration with the National College of Education.

Brainerd, John W. *Nature Study for Conservation.* New York: Macmillan, 1971.
-Introduction to ecology; techniques in observation, recording, identifying, collecting and experimenting. Junior high - college.

Brennan, Matthew J., ed. *People and Their Environment.* Chicago: J.G. Ferguson.
-A series of eight curriculum guides on conservation education, including a guide to using an outdoor laboratory. Contains lesson plans, as well as lists of materials which can be used with each lesson. Many of the lessons involve use of the school site.

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-A series of 41 publications covering topics from "Ice and Snow" to "Decay" and "Food Chains." A set of references for teachers and young people alike. Inexpensive.

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-Suggestions and ideas for making children more critically aware of shapes in their environment and the inter-relationships. K-4.

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-Contains over one hundred pages of ideas regarding ways to develop creative play and natural areas on your school site to meet the needs of children. A reference book for educator and architect alike.

Milliken, Margaret, Austin F. Hamer and Ernest C. McDonald. *Field Study Manual for Outdoor Learning.* Minneapolis: Burgess, 1968.
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Swan, Malcolm, ed. *Tips and Tricks for Outdoor Education.* Danville, Ill.: Interstate, 1970.
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-In addition to the national environmental study area program which is outlined, this publication contains information concerning the strand approach to environmental education. While the application of this booklet to an existing school site effort is not that direct, keep it in mind if a major area in your community is being considered for acquisition as open space.

VanMatre, Steve. *Acclimatization.* Martinsville, Ind.: American Camping Assoc., 1972.
-An inspirational reference covering techniques and tips for using natural areas, using a sensory approach. It also contains a number of good suggestions as to how to build a nature trail.

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A Guide to Planning and Conducting Environmental Study Area Workshops. Washington, D.C.: National Education Association, 1972. (#191-05944; $2.25).
-Developed for use in environmental study areas, but much of the material would be helpful in launching an inservice program covering the use of the site.

Stapp, William B. *The Environment and the Citizen*. Ann Arbor, Mich.: Univ. of Michigan Press, 1973.
-Note: Two extension courses are offered through the University of Michigan, Ann Arbor, which are based upon this book. Core units are Man and the Environment, Population & Urbanization, and Ecology. There are 11 elective units which range from government policy to the various natural resources, and the role of the citizen. The course(s) can be taken for academic or non-academic credit. It would provide an excellent way for either individuals or groups of teachers to "participate" in an inservice program under one of the leaders in environmental education. Contact Department of Independent Study, Extension Service, Univ. of Michigan, Ann Arbor, Michigan 48104.

SOURCES OF EDUCATIONAL MATERIALS

Educational Services, National Audubon Society, 950 Third Avenue, New York, N.Y. 10022.
-Numerous references, teaching aids and student workbooks. *A Place to Live*, a field study manual for the study of urban ecology (grades 3-6), is especially good.

Environmental & Outdoor Education Materials Co., Dowling, Mich. 49050.
-Source for innumerable items--books, ecology games, A-V materials, field equipment, records, etc. Publish catalog listing all materials.

Illinois Dept. of Conservation, Division of Education, 605 State Office Bldg., Springfield, Illinois 62706.
-Source for films and publications.

Illinois Institute for Environmental Quality, 309 West Washington Street, Chicago, Ill. 60609.
-Publishes a directory of environmental groups arranged by county, name, phone number. Also a source of environmental education materials.

Mine Publications, Inc., 25 Groveland Terrace, Minneapolis, Minn. 55403.
-A series of books on things to do in, on and around your school site and community. Titles include *Astronomy, Birds, The Dandelion, Ecology, Mapping, Small Places, Mini-Climates, Pollution, Running Water, Small Creatures, Snow & Ice, Trees, Your Senses*--well done, but prices are at a commercial level.

National Wildlife Federation, 1412 16th Street, N.W., Washington, D.C. 20036.
-Ask for information on their "Environmental Discovery Unit" series. This is an excellent series.

Nature Study Guild, Box 972, Berkeley, California 94701.
-They publish an excellent tree finder and flower finder.

Office of the Supt. of Public Instruction, State of Illinois, Environmental Education Division, Springfield, Illinois 62706.

Reed & Sons, Outdoor Education Specialists, Box 150 Rt. #2, Perrysville, Ohio 44864.

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